Flora

of

The Central Wasatch

and

Adjacent Valleys

A Field Guide

Stephen L. Clark

Editio ultima

Flora of the Central Wasatch

A Field guide

2019

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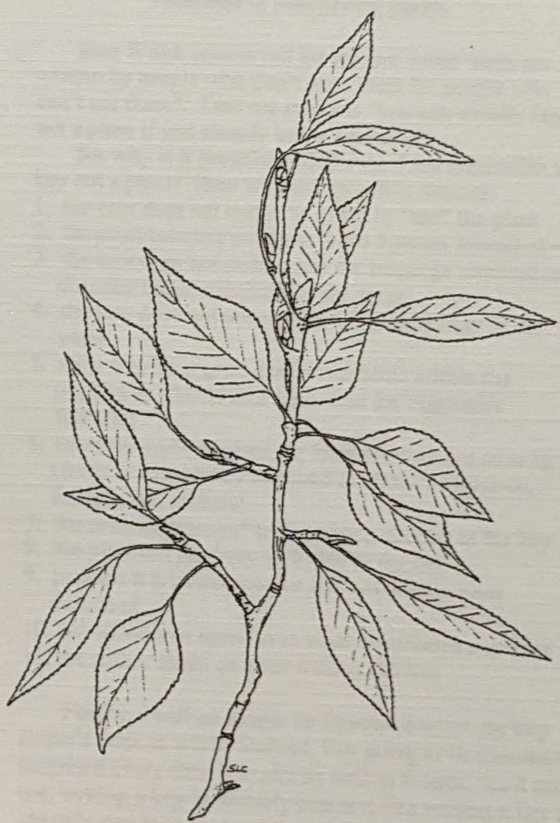
Acknowledgements

A special thanks has to be given to colleagues, former students and local amateur botanists who have contributed many new taxa to this key and helpful suggestions to make it more useful. My deepest gratitude goes to Stan Welsh, my teacher and my friend.

Index

The first step in learning all that has ever been written about a plant is to know its name

S. Clark



Problems in identifying plants

Stan Welsh used to tell his student's that "keys are written by people who don't need them for people who can't use them". I tell my students "you can usually key out a plant if you already know what it is".

So, why is it sometimes difficult, if not impossible to key out a plant? Here are some possible reasons:

1. the user does not make the effort to "see" the plant
2. the plant behaves poorly ie it has 5 petals instead of 4
3. the user does not understand the language required to describe the morphology of the plant
4. the user does not understand the morphology of the plant
5. there may be a great deal of variation within the population (this is especially true for vegetative features)
6. essential parts required for identification are missing (fruits are absolutely required to identify mustards, borages and umbels)
7. the students "jumps" to the wrong couplet in the key
8. the plant has not been included in the key
9. perhaps it is a new species and has not yet been described
10. not all authors agree as to what constitutes a species
11. the author made an error writing the key

Finally, I will no longer be frustrated when my key doesn't seem to work. Instead, I'm going to be pleasantly surprised every time it works as well as it does. As it turns out, writing a key to identify plants is like writing a key to identify clouds as they move across the sky. Keying out plants in some genera is like trying to lasso a rainbow. It shouldn't be that way. Species should be easy to identify. If they are not easy to separate it probably means they are not different species after all.

Preface

This field guide includes all vascular plants known to occur in Davis, Morgan and Weber Counties, Utah. It treats 98 families, 425 genera and 921 species. Plants have not been included if (1) I have not seen them in the field, (2) voucher specimens were not collected by those reporting new taxa, (3) because I don't consider the taxon to be valid.

Taxonomic concepts

I have chosen, as permitted by the International Rules of Botanical Nomenclature, to use historical names for seven families. I am also ignoring the "new taxonomies" based on molecular markers. Molecular studies tend to take both the plant and the researcher out of the environment where the plant lives and become reductionist and mechanistic in nature, forgetting that these markers may have absolutely no selective value and that natural selection works only on gene expression.

Taxonomy is not an exact science and there are no strict rules that must be followed in defining taxa. Therefore, I have taken a conservative approach to the definition of a species convinced that too many taxonomists have little tolerance for minute differences between plants, the consequence of which is that as more and more species are named, more and more species must be named.

It is readily apparent that our taxonomic studies of vascular plants are not finished. It is the opinion of this writer that boundaries between genera in the *Umbelliferae and Polemoniaceae* are very un-clear. Distinctions between taxa in of the *Cruciferae, Chenopodiaceae, Artemisia, Opuntia, Erigeron, Arnica, Carex, Saxifraga, Solidago, Penstemon, Senecio, Viola, Phacelia* and *Stephanomeria* are not always clearly defined.

The work goes on.

Introduction

I don't know why I became a plant taxonomist. It must have been magic. Many years spent traipsing through the State of Utah conducting range inventories for the Department of Fish and Game certainly contributed to my decision. But, I can't remember if I really made a decision. It just sort of happened. That's the way most things happen with me: the Taoist idea of doing without doing.

There has always been a great deal of wanderer and explorer blood flowing through my veins. The idea of seeing new wild things in new wild places always excites me. I think I know how Darwin might have felt when he wrote "Delight itself, however, is a weak term to express the feelings of a naturalist who, for the first time, has wandered by himself in a Brazilian forest," for I too have wandered through the islands of the Galapagos, the rainforests of Central America and Thailand, the black water of the upper Amazon River Basin, the mountains of Peru, as well as the savannahs, deserts and woodlands of Kenya, Botswana, Zambia, South Eastern Mexico, Australia and the American West.

Sure, as a student and as a professor, I have dabbled in modern science. I have marveled at how modern instrumentation can be used to pry open nature's secrets. I have chased after chromosomes and anthocyanin pigments, peeked into the spectrum of infra-red light waves reflected from flowers, cut and recombined genes from plasmids, sifted through the layers of seed coats with a scanning electron microscope and found all these inquiries fascinating. But, my passion is classical plant taxonomy. With a flora and a hand lens I have made my place in this world. I like simplicity.

I'll never forget the feeling that I had finally found my place when as a student beginning my Ph.D. program I first set foot in the herbarium at Brigham Young University. I became intoxicated by the faint aroma of moth balls, by the sight of neatly pressed specimens orderly arranged on sheets of mounting paper and by the energy that radiated from Dr. Stan Welsh. Somehow these things all spoke to me, lifting my thoughts out of the technological quagmire we call the modern world into a more sensible time and place.

There is magic for me in classical plant taxonomy. I feel security in old things and old time tested ways. Plant taxonomy allows me to remain a naturalist studying living plants as complete organisms interconnecting with a complex environment, rather than just molecules in a test tube, or images on a computer screen.

It's tragic that so many modern scientists view living and non-living things as machines made of smaller and smaller pieces. To them, life is no longer mystical. Wonder and awe have been shoved through some black hole in the universe. Yet, if I can sit on a rock and identify the flower in my hand, understand it's place in the

universe, have a conversation with a Sea Lion on a sandy beach in the Galapagos, or walk through a rainforest with an Amazonian Shaman I can still find peace and fulfillment. I know that the pendulum of modern science has left us romantics temporarily behind, but that just leaves more real work for me and others like me to do. There are, after all, still unknown places and unknown plants to find and describe and ancient problems to solve. As Lincoln Constance once said, "It is a moot question whether man will succeed in describing the worlds remaining flora before he inadvertently succeeds in destroying it!" I may be a bit of a dinosaur, but if so, I'm a happy dinosaur.

As I look about my study at home and my office at the university I realize I have found a touch of peace, a taste of serenity, a feeling of self-acceptance in my professional and personal life.

Both places of study are characterized by a combination of simplicity and antiquity. A glance from the chair in my study brings to view the sight of a Pennsylvania flintlock rifle, hunting bag and powder horns, a coal oil lamp, an old English longbow, a Massai spear, an Indian quiver, an aboriginal hunting boomerang, Sereno Watson's flora of the 40th parallel expedition, Stansbury's book on the Great Salt Lake and a 1920's era banjo.

My office is just as simple. There are no file cabinets. There is a small table with a few floras, some poetry, a couple of ancient religious texts, stories of great explorers and naturalists and my notes on the uses of plants by indigenous people gathered first hand from natives on five continents. On the walls are photographs of American deserts, Central American, Asian and Australian rainforests, the upper Amazon River, African savannahs and the cloud bathed mountains of Southern Mexico, the Andes and the people who call these places home.

A few years ago I threw almost everything away, keeping only those few items that would reflect my new path. Decisions were often difficult, but choices had to be made. I knew I could not be all things to all people. I had to find that which was really me.

It seems I am more philosopher, poet and artist than scientist. I ask different questions than I asked three decades ago. I am one of the last naturalists, content to approach my inquiries with a predominantly right brain. And yet, in this sophisticated high tech world, there is still a place for me just as there is a place for desert tortoises surrounded by singing birds at Lytle Ranch. You see, the world still needs someone to visit the unvisited places, to see life that has not yet been seen and to protect the life that we through ignorance, selfishness and greed seem prone to destroy. And maybe, just maybe, our modern, new students still need to be reminded of that which is old.

Yes, I am content in my new place for finding it required much self-examination. Like the Phoenix in the fable I emerged as if born again. Removing the shackles of trying to keep pace with the lemmings has set me free.

Now with spontaneity and serendipity, I can grow without design, nor direction into whatever I may yet become. I am free to spend the rest my life feeling the ecstasy that Townsend proclaimed when he wrote, "None but a naturalist can know a naturalist's feelings, his delight amounting to ecstasy when, a specimen such as he has never seen meets his eye and the sorrow and grief that he feels when he must tear himself from a spot abounding with all that he has anxiously and unremittingly sought for."

And so, this little book is more than just a field guide. It is a part of me and whatever I have become. I hope that it too will become a part of you.

Stephen L. Clark
Huntsville, Utah
Jan 8, 2019

Physiography

The Central Wasatch Mountains lie directly astride the boundary between two major physiographic provinces: the Basin and Range, and the Middle Rocky Mountains. These provinces are further divided into five smaller physiographic units: (1) Great Salt Lake Valley, (2) Wasatch Mountains, (3) Back Valleys, (4) Eastern Highlands, and (5) Lake Islands. For political purposes the area is defined as Weber, Davis and Morgan Counties, Utah.

Great Salt Lake Valley

The Great Salt Lake Valley extends westward from the base of the Wasatch Mountains. Its western portion is a broad, almost flat plain composed largely of lake bottom deposits from ancient Lake Bonneville, partly modified by young erosion and deposition principally by streams. The eastern portion, that part lying adjacent to the Wasatch Mountains, is steeper and characterized by local faulting, Bonneville-aged beaches, deltas, alluvial fans and recent cutting by streams.

This plain is bordered by the north-south trending Wasatch Mountains. The valley represents a large down dropped graben, or a tilted half-graben and sediments up to 6000-8000 feet thick are present.

Wasatch Mountains

The Wasatch Mountains are the most conspicuous physiographic feature of north-central Utah. The main ridge of the range lies along a north-south axis through the center of the study area. It contains peaks that rise 5000 feet above the valley floor. The highest peak is Ben Lomond Peak, elevation 9712 feet.

Generally, the western side of the range is steeper than the eastern side. However, both sides exhibit areas of gentle slopes and steep inclines, the latter partly due to the presence of faults along which the mountain blocks were uplifted. This uplift is evidenced on western slopes by numerous triangular facets and fault scarps. Two large east-west canyons, Weber Canyon occupied by the Weber River and Ogden Canyon, occupied by the Ogden River, are found within the study area. In addition, numerous small canyons have been cut into the slopes on both sides of the range. Some of these contain perennial streams, but most are ephemeral.

The Wasatch Mountains were formed by two separate events with combinations of thrust and normal faults. During the late Mesozoic, compression forces began to build the ancestral Wasatch Mountains by thrust faulting. These compression forces caused mountains to form that contained older Pre-Cambrian metamorphic

rocks and Paleozoic sedimentary rocks. These rocks were completely folded and faulted to the degree that old layers are often found on top of much younger ones, as can be readily seen on the sides of Ogden Canyon. These early mountains probably largely eroded. Regional normal faulting then occurred during Tertiary to recent times, lifting the Wasatch Mountains and the Bear River Range to their present positions and down dropping the Great Salt Lake and back valleys. Water and glacial action then shaped the mountains into their present physiography.

Back Valleys

A long northwest-trending depression lies within the Wasatch Range. It is divided into two valleys each with its own drainage system. Ogden Valley, the northernmost of the two, is about 12 miles long and three miles wide. Three perennial streams enter the valley from the north and east. The North Fork of the Ogden River drains the mountains at the northern end of the valley and is the longest stream within the valley. The Middle Fork of the Ogden River drains the western portion of the Bear River Range. The South Fork of the Ogden River drains the southern part of the same range. Four small, ephemeral streams also enter the valley. These are: Gertsen Creek, Wolf Creek, Bennett Creek, and Hawkins Creek. The valley also contains several small springs. The surface water and much of the ground water that is present in Ogden Valley eventually flows into Pineview Reservoir. Water from Pineview Reservoir flows westward down Ogden River and into the Great Salt Lake Valley, joins the Weber River and flows into the Great Salt Lake.

On the edges of both valleys the terrain begins to steepen. Elevations rise gently along old weakly developed Lake Bonneville terraces and post- Bonneville fans.

Morgan Valley is fifteen miles long and three miles wide. The greatest part of this valley is the flood plain of the Weber River. Two major perennial, graded streams enter into this valley. They are Lost Creek and East Canyon Creek. Each of these contains a large reservoir near their upper end. Numerous smaller streams also enter the valley from the west draining the eastern slopes of the Wasatch Mountains, while other streams enter from the east, thus draining a southern portion of the eastern highlands. Both valleys represent down dropped grabens or tilted half grabens that formed during Tertiary to recent extension. Both valleys are bordered by normal faults on their east sides, and both valleys are filled with thick deposits of Tertiary to recent sediments and volcanics.

Eastern Highlands

Eastward from the back valleys, foothills rise gently to form rolling flat-topped mountains of about 8000-feet elevation known as the Eastern Highlands. They are the southern extension of the Bear River Range. The highlands consist of late Precambrian to Tertiary sedimentary rocks and Quaternary colluvium and alluvium.

Lake Islands

Two islands of the Great Salt Lake are located within the three counties. Antelope Island, the larger of the two, is located in Davis County. It is a north-south trending island fifteen miles long and three to four-miles wide. Its maximum elevation is 6400 feet rising some 2200 feet above the surface of the lake. Several small, ephemeral streams and some small springs are located in the bottoms of its shallow canyons.

Fremont Island, named in honor of Captain John C. Fremont, is located in Weber County. It trends northwest-southeast and is three-fourths-mile long and one-fourth-mile wide. Its maximum elevation is 4995 feet. The island has no streams and only one small spring.

Both islands probably originated as uplifted blocks (horsts) during the same time as the present Wasatch Range and the Eastern Highlands were formed.

Antelope Island consists of older Precambrian metamorphic and igneous rocks and late Precambrian to Paleozoic sedimentary rocks mantled locally by a thin layer of Quaternary lake deposits, colluvium and alluvium. Fremont Island consists only of late Precambrian sedimentary rocks with a thin cover of Quaternary lake deposits.

Climate

The area is broadly defined as semi-arid. However, due to great differences in elevation and exposure, considerable variation in mean annual precipitation is found ranging from a semi-arid condition of six inches or less on the islands of the Great Salt Lake to a sub-humid climate of 45 inches along the tops of the Wasatch Mountains.

In general, seasons are characterized by a wet spring (March to May), warm-to-hot, dry summer (June to August), cool, dry autumn (September to November) and cold, snowy winter (December to February).

Summer storms in the low valleys are infrequent while storms of short duration and high intensity are common in the mountains. The greatest recorded storm intensity in Farmington Canyon was 2.04 inches per hour. These summer storms are usually a product of convective thunderstorms although some originate when weak cold fronts moving eastward from the Pacific lift the warm, moist air that

has come into our area from the Gulf of Mexico. Prevailing winds are from the south and southwest.

Winter storms generally originate with strong frontal systems moving in from the Pacific Northwest and account for 80 percent of the precipitation with most of this falling as snow at elevations above 7000 feet. Snow records from Farmington Canyon show an average depth of snow pack at 7600 feet elevation of 53.3 inches with a water content of 18.6 inches. Snow depths of 18 feet or more in drifts along the mountaintops are common.

Smaller climatic differences such as those found on north-or south-facing slopes of ridges or canyons, particularly if they are steep, are also important. South-facing slopes have greater insulation, higher ground temperature and drier soils. Air temperatures are generally cooler in the canyon bottoms and on the north-facing slopes, while relative humidity is quite variable.

Moisture content of the snow pack is also quite variable. In general south-facing slopes and areas covered by heavy stands of conifers have a greater percentage of moisture per unit of snow depth than those open areas on north-facing slopes. These small, local climatic differences greatly influence the distribution of plants and communities within the study area.

Plant Communities

Twelve plant communities are defined. Three are limited to the Bonneville Basin. The others are found along the Wasatch Range, the Back Valleys, Eastern Highlands and Antelope Island.

Saline Marsh

Immediately adjacent to and/or part of the eastern edge of the Great Salt Lake lies a saline marsh community. Elevations range from 4200 to 4300 feet. The ground is essentially flat and covered throughout much of the year with shallow, brackish water.

Cattails and tules are the dominant emergent vegetation, while pond weeds and smart weeds are to be found floating in most areas of standing, open water. Open flat lands are often covered with goosefoot.

Important plants are: *Scirpus acutus, Scirpus maritimus, Typha domingensis, Typha latifolia, Salicornia rubra, Eleocharis palustris, Carex nebraskensis, Carex aquatilis, Polygonum amphibium, Polygonum convolvulus, Polygonum persicaria, Polygonum punctatum, Potamogeton pectinatus, Conium maculatum, Distichlis spicata, Solanum dulcamara, Polypogon monspielensis. Phragmites australis.*

Salt Desert Shrub

Upland from and often adjacent to the saline marsh area is a region with a drier, clay, alkaline soil. Elevations range from 4300 to 4400 feet. Greasewood-dominated flats and saltgrass meadows are characteristic of the moist lowland portions of this habitat. Slightly higher and drier sites support a mixture of saltgrass and woody chenopods.

Important plants are: *Sarcobatus vermiculatus, Allenrolfea occidentalis, Atriplex confertifolia, Atriplex patula, Chenopodium album, Kochia scoparia, Distichlis spicata, Bromus tectorum, Cleome serrulata, Hordeum jubatum.*

Fire Modified Mixed Grass

Only the foothill areas of Antelope Island and Fremont Island are defined as mixed grass. This community lies between 4200 feet and 4800 feet, and is characterized by dry sandy-rocky soil covered with mostly annual grasses, these probably being perpetuated by recurrent fire.

Important plants are: *Bromus tectorum, Bromus diandrus, Oryzopsis hymenoides, Atriplex confertifolia, Grayia spinosa, Abronia fragrans, Sphaeralcea coccinea, Chrysothamnus nauseosus. Stipa comata, Aristida longiseta.*

Big Sagebrush

Sagebrush-dominated plant communities are widespread over much of the area on well-drained, sandy soils from the foothills of the Wasatch Mountains to the high ridges of the Wasatch front range. Bigsagebrush, big rabbit brush, and snakeweed dominate the lower elevations, while black sagebrush and yellow rabbit brush are found mostly at higher sites.

Important plants are: *Artemisia tridentata, Artemisia ludoviciana, Gutierrezia sarothrae, Elymus trachycaulus, Elymus triticoides, Chrysothamnus nauseosus, Chrysothamnus viscidiflorus, Bromus japonicus, Bromus tectorum.*

Juniper

Stands of juniper are infrequent, small in size, and most often found on moderate-to-steep south- or west-facing slopes between 5500 and 6500 feet. Soils in this type are shallow, sandy to rocky, dry and well drained. Utah juniper and western red cedar are the dominant plants with curl leaf mountain mahogany and gambel oak also frequently found.

Important plants: *Juniperus osteosperma, Juniperus scopulorum, Artemisia tridentata, Quercus gambelii, Sporobolus airoides, Oryzopsis hymenoides, Oenothera pallida.*

Mixed Mountain Brush

This is the largest plant community. It is found on almost all east-, west-, and south-facing exposures at elevations of 4600 to 7500 feet, and on north-facing exposures at lower elevations. Oak, maple, and mahogany are the dominant plants. Soils are generally dry, shallow on the rocky slopes, or deep on flat areas and in basins. Slopes are moderate to steep.

Important plants are: *Quercus gambelii, Acer grandidentatum, Cercocarpus ledifolius, Acer glabrum, Prunus virginiana, Physocarpus malvaceus, Purshia tridentata, Amelanchier utahensis, Berberis repens, Holodiscus dumosus, Hydrophyllum capitatum, Allium acuminatum, Penstemon cyananthus.*

Aspen

Aspen communities are usually found in pockets on north-or east-facing slopes at elevations between 6800 and 8000 feet, and in dense stands on flat areas or hillsides at higher elevations. The soils are deep, dark and rich in organic matter. Quaking aspen is the dominant plant, but a dense understory of snowberry, chokecherry and mixed forbs is often usually present.

Important plants are: *Populus tremuloides, Symphoricarpos oreophyllus, Prunus virginiana, Thalictrum fendleri, Geranium fremontii, Geranium richardsonii, Rudbeckia occidentalis, Valeriana occidentalis, Heracleum lanatum, Mertensia ciliata, Aster engelmannii, Delphinium occidentale, Castilleja applegatei, Bromus ciliatus.*

Mixed Conifer

Dense stands of conifers are found on most north-facing slopes in the canyons at elevations of 6000-8500 feet and on the eastern side of the mountains at higher elevations. Slopes are often steep at the lower elevations and more gentle at higher elevations. Soils are usually shallow and with a deep layer of litter.

White fir and Douglas fir dominate the lower elevations while alpine fir, Englemann spruce and limber pine are found in higher sites. In general the conifer stands are dense enough to prohibit any substantial development of understory vegetation.

Important plants are: *Abies concolor, Pseudotsuga menziesii, Picea engelmannii, Ribes montiginum, Sambucus caerulea, Heuchera rubescens, Heuchera parviflora, Carex microptera.*

Mountain Meadow

This community is often found in, or around shallow basins, broad canyon bottoms and damp to wet flatlands at elevations of

7000-9000 feet. Soils are usually dark, deep and damp to wet. Perennial grasses, forbs and sedges dominate these sites.

Important plants are: *Poa pratensis, Arrenatherum elatius, Elymus trachycaulus, Phleum pratense, Melica bulbosa, Mertensia ciliata, Camassia quamash, Veratrum californicum, Scirpus microcarpus, Zigadenus elegans, Wyethia amplexicaulis, Orthocarpus luteus, Orthocarpus purpureo-albus, Potentilla fruticosa, Lonicera involucrata.*

Subalpine

Subalpine communities are found only along the ridges of the Wasatch Mountains and mountain tops of the easter highlands at elevations near 9000 feet. Soils are shallow, extremely rocky and normally dry. The vegetation consists mostly of low woody plants, and low perennial forbs and grasses. Trees when present are usually distorted by strong winds.

Important plants are: *Artemisia tridentata, Koeleria macrantha, Elymus spicatus, Oxyria digyna, Saxifraga arguta, Ivesia gordonii, Swertia radiata, Viguira multiflora, Antennaria parvifolia, Sedum debile.*

Alpine

An alpine flora is found only on the tops of the highest mountains at elevations of 9400-9700 feet. These sites are extremely rocky and without well-defined soil. Trees and tall plants are noticeably absent. Dominant plants include sagebrush, small perennial forbs and some low grasses.

Important plants are: *Pinus flexilis, Artemisia tridentata, Synthris pinnatifida, Draba burkei, Penstemon humilus, Lesquerella multiceps, Elymus spicatus, Festuca pratensis, Carex phaeocephala.*

Riparian

A diverse riparian habitat is found throughout the area in all canyons that contain perennial streams at elevations from 4200 to 9000 feet. The diversity of this habitat is in part a function of elevation, hence this type is subdivided into three often overlapping areas: (1) high elevations above 8000 feet, (2) middle elevations between 6000 and 8000 feet, and (3) low elevations below 6000 feet.

High elevation riparian. This community generally originates in a basin, or meadow area. It is typified by dense stands of perennial forbs, sedges, perennial grasses and willows. Soils are wet to damp, deep and dark. Streams are usually small, slow moving and contain silty bottoms.

Important plants are: *Salix bebbiana, Salix geyeriana, Salix scouleriana, Rhamnus alnifolia, Habenaria dilatata, Scirpus microcarpus, Catabrosa aquatica, Mimulus lewisii, Juncus longistylus, Juncus ensifolius, Carex praegracilis, Alopecurus aequatis, Glyceria grandis.*

Middle elevation riparian. At lower elevations the canyons steepen and the volume and velocity of the streams increase. Canyons are often deep and V-shaped. Stramsides and bottoms are often rocky with little soil depth. Streams are usually bordered by tall shrubs such as dogwood. Habitat for grasses, forbs and sedges is generally reduced.

Important plants are: *Cornus sericea, Salix lucida, Acer grandidentatum, Amelanchier alnifolia, Rubus parviflorus, Clematis columbiana, Ranunculus sceleratus, Senecio serra, Cardamine cordifolia, Carex rostrata.*

Low elevation riparian. At lower elevations the streams are generally slower, wider and often with large flood plains. Here the soils are usually deeper and more productive. Such sites are dominated by cottonwood, birch, and willow, with a mixture of forbs and grasses.

Important plants are: *Populus angustifolia, Betula occidentalis, Salix exigua, Acer negundo, Crataegus douglasii, Alnus tenuifolia, Smilacina stellata, Smilacina racemosa, Steironema ciliatum, Carex lanuginosa, Juncus bufonius.*

History of Botanical Exploration

On September 6, 1843, Captain John C. Fremont on an assignment to connect the interior land surveys made by the Wilkes expedition in 1841 camped on the Weber River Delta in present Weber County. The next morning he set out for an island in the Great Salt Lake, later to be called Fremont Island, but which he referred to as "Disappointment Island." He collected plants there for two days then returned to the Weber River Delta where on September 9, additional plants were collected. These collections were the first to be made for the purpose of scientific inquiry from this area. Included were *Atriplex canescens, Atriplex confertifolia* and *Chrysothamnus nauseosus.* They were later sent to John Torrey of Columbia University.

In 1857 Jane Carrington made a collection of plants from the "Salt Lake Area." These were later given to Elias Durand at the Academy of Natural Sciences in Philadelphia. Using this collection, and those of Fremont and Stansbury, Durand wrote the first local flora

for Utah entitled, "A Sketch of the Botany of the Basin of the Great Salt Lake of Utah."

In 1860 Sereno Watson traveling with the King exploration of the fortieth parallel explored the mountains of the study area and the islands of the Great Salt Lake. The results of this effort were published by Watson in 1871 as Part Five of the "Report of the geological exploration of the fortieth parallel." Watson's contribution was of great value and consequence. The number of new species he discovered is staggering.

During this period 1843-1869 other botanists were also in the area. In 1845 Joseph Burke, a collector from England traveled through the area. In 1854, Lieutenant Edwin O. Beckwith while re-surveying Stansbury's old route passed through the area. In 1871 John C. Coulter was in Northern Utah. Little is known of their collections (if any) from this area.

The only other botanists who have contributed to an understanding of this flora are Francis W. Pennell, and A. O. Garrett. Francis W. Pennell of the New York Botanical Garden collected several species from this area as recorded in his publication on the "Scrophulariaceae of the Rocky Mountain States."

The most recent collections have been made by this writer, who from 1965 to the present has collected extensively in the area and by Jason Baker, Blake Wellard and Lawrence Quinn who have added many new taxa to this key.

KEY TO DIVISIONS AND CLASSES

1. Stems terminated with a strobolis; sori, flowers, or woody cones never present (2)
1. Stems without a strobolis; sori, cones, or flowers present (3)
   2. Stems jointed and fluted, hollow; leaves reduced to a whorl of united scales at the nodes; plants erect. **DIVISION *Equisetophyta p. 1***
   2. Stems not as above; leaves overlapping, not whorled; plants moss-like, low and creeping. **DIVISION *Lycopodiophyta p. 1***
3. Spores produced in sporangia borne upon the leaves either in clusters, or on the leaf margins; leaves broad, the young tips coiled; flowers and woody cones lacking. **DIVISION *Polypodiophyta p. 2***
3. Spores not produced on the leaves; leaves various, tips not coiled; flowers, or woody cones present (4)
   4. Flowers absent; seeds borne on scales in woody cones that open at maturity, or in small oval bluish cones that lack scales; plants woody. **DIVISION *Pinophyta p. 3***
   4. Flowers present; seeds borne in an enclosed ovary; plants woody, or herbaceous (5) **DIVISION *Magnoliophyta p.5***
5. Leaves pinnately, or palmately veined; floral parts when present of definite number in sets of 5, 4, or rarely 2, or 3; herbaceous, or woody plants. **CLASS *Dicotyledoneae p. 5***
5. Leaves with parallel veins; floral parts when present of definite number in sets of 3, never 2, 4, or 5; herbaceous plants only. **CLASS *Monocotyledoneae p. 74***

DIVISION *LYCOPODIOPHYTA*

Selaginellaceae

Selaginella watsonii

DIVISION *EQUISETOPHYTA*

Equisetaceae

Equisetum

1. Stems of 2 kinds, one branched, the other un-branched; leaves about 1 cm long. *E. arvense*
1. Stems of one kind, unbranched, or with a few whorled branches; leaves less than 5 mm long (2)

2. Stroboli terminated by a small pointed tip; leaf sheath with a white band. *E. hyemale*
2. Stroboli rounded, lacking the pointed tip; leaf sheaths without white band. *E. laevigatum*

DIVISION *POLYPODIOPHYTA*

1. Plants free floating aquatics, less than 2 cm wide. *Salviniaceae*
1. Plants not free floating, may be aquatic, or terrestrial, much larger (2)
   2. Leaves appearing 4-foliate; plants aquatic, or semi-aquatic. *Marsileaceae*
   2. Leaves pinnatifid; plants terrestrial (3)
3. Leaves of two types; spore bearing leaves obviously different in appearance than non-spore bearing leaves. *Ophioglossaceae*
3. Leaves all the same. *Polypodiaceae*

Marsileaceae

Marsilea vestita

Ophioglossaceae

Botrychium virginianum

Polypodiaceae

1. Sori born on veins, not on leaf margin (2)
1. Sori born on leaf margins, exposed, or protected by the recurved leaf margins (6)
   2. Sori round in outline (3)
   2. Sori elongated, or horseshoe shaped (5)
3. Indusium borne on a stalk in the center of the sorus (like an umbrella). *Polystichum*
3. Indusium not as above (4)
   4. Indusia attached on one side only; veins in leaves prominent. *Cystopteris*
   4. Indusia attached below the sori and splitting into star-shaped segments; veins not as above. *Woodsia*
5. Sori curved across the veins; blades 2-3 pinnate. *Athyrium*
5. Sori straight, on sides of veins, oblique to the margin and midvein; blades once-pinnate. *Asplenium*

6. Mid-vein of leaves black, or reddish-black. *Adiantum*
6. Mid-vein of leaves not as above (7)
7. Plants densely tufted; leaves usually less than 1 dm long; growing mostly in rock crevices. *Pellaea*
7. Plants not tufted; leaves 2.5-6 dm long; growing in loose soil. *Pteridium*

Adiantum pedatum

Asplenium viride

Athyrium
1. Sori oblong to elongate. *Athyrium filix-femina*
1. Sori round. *Athyrium distentifolium var. americanum*

Cystopteris fragilis

Pellea breweri

Polystichum
1. Lower pinnae deeply lobed. *P. scopulinum*
1. Lower pinnae not lobed, the bases asymmetrical. *P. lonchitus*

Pteridium aquilinum var. *pubescens*

Woodsia
1. Pinnae with flattened multicellular hairs; petioles reddish-brown, or purple. *W. scopulinum*
1. Pinnae not as above; petioles light brown. *W. oregana*

Salviniaceae

Azolla mexicana

DIVISION *PINOPHYTA*

1. Leaves scale-like, or awl-like, opposite; cones round-oval, pale bluish-purple, hard, but not woody. *Cupressaceae*
1. Leaves needle-like, narrowly linear, spirally arranged on the stems; cones elongated, with conspicuous scales, woody, not as above. *Pinaceae*

Cupressaceae

Juniperus

1. Leaves always awl-like; low shrubs. *J. communis*
1. Leaves scale-like, with very few awl-like leaves; trees (2)
    2. Edges of leaves minutely serrulate (as seen through a hand lens). *J. osteosperma*
    2. Edges of leaves never serrulate. *J. scopulorum*

Pinaceae

1. Needles in clusters of 2-5 (except in *P. monophylla* which has single leaves that are round in cross section). *Pinus*
1. Needles not in clusters, but borne singly, 4-sided, or flattened in cross section, never round (2)
    2. Needles 4-sided in cross-section; leaves borne on rough stalks called sterigmata. *Picea*
    2. Needles flattened in cross-section; branches may be rough, but lack sterigmata (3)
3. Cone scales persistent; female cones with conspicuous 3-forked bracts. *Pseudotsuga*
3. Cone scales deciduous; female cones without bracts. *Abies*

Abies

1. Female cones gray-green; resin ducts in the needles positioned adjacent to the lower epidermis. *A. concolor*
1. Female cones dark brown-purple; resin ducts in the needles positioned centrally. *A. lasiocarpa*

Picea

1. Twigs finely pubescent; cones 3-6 cm long. *P. engelmannii*
1. Twigs glabrous; cones 6-12 cm long. *P. pungens*

Pinus

1. Needles solitary. *P. monophylla* (rare in our area)
1. Needles in clusters of 2, 3 or 5 (2)
    2. Needles in clusters of 3. *P. ponderosa*
    2. Needles in clusters of 2, or 5 (3)
3. Needles in clusters of 2. *P. contorta*
3. Needles in clusters of 5. *P. flexilis*

Pseudotsuga menziesii var. *glauca*

DIVISION *MAGNOLIOPHYTA*

CLASS *Dicotyledoneae*
(If flowers are imperfect, see key on page 91)

1. Perianth consisting of sepals, or lacking; sepals when present resembling petals in color and/or shape (2)
1. Perianth consisting of both sepals and petals (3)
   2. Plants woody; trees, shrubs, sub-shrubs, or climbing vines; in *Viscaceae* parasitic on conifer branches. *Group 1*
   2. Plants herbaceous, or with a woody base only. *Group 2*
3. Petals united, at least slightly. *Group 3*
3. Petals separate ((4)
   4. Stamens numerous, more than twice as many as the petals. *Group 4*
   4. Stamens few, not more than twice as many as the petals, or flowers imperfect. *Group 5*

Group 1: Plants trees, shrubs, sub-shrubs, or climbing vines.

1. Plants parasitic, attached to the branches of conifers, rooting in the host. *Viscaceae*
1. Plants not parasitic, rooting in the soil (2)
   2. Leaves opposite (3)
   2. Leaves alternate (10)
3. Plants herbaceous (4)
3. Plants trees, or shrubs (6)
   4. Plants vines (5)
   4. Plants not vines. *Callitrichaceae*
5. Leaves compound. *Ranunculaceae*
5. Leaves simple. *Cannabinaceae*
   6. Stems with milky juice. *Moraceae*
   6. Stems without milky juice (7)
7. Leaves compound (8)
7. Leaves simple (9)
   8. Leaflets 3, or 5; fruit pubescent. *Aceraceae*
   8. Leaflets 7; fruit glabrous. *Oleaceae*
9. Leaves palmately lobed. *Aceraceae*
9. Leaves entire. *Cornaceae*
   10. Leaves compound (11)
   10. Leaves simple (12)
11. Leaves evergreen; leaflets with spiny margins. *Berberidacaee*

11. Leaves deciduous; leaflets entire, or with serrate margins, never spiny. *Leguminosae*
    12. Plants trailing vines. *Polygonaceae*
    12. Plants trees, or shrubs (13)
13. Flowers of one, or both sexes in catkins (14)
13. Flowers not in catkins (17)
    14. Perianth lacking (15)
    14. Perianth present (16)
15. Plants monoecious; staminate flowers attached to a bract of the catkin. *Betulaceae*
15. Plants dioecious; staminate flowers attached to the central stalk of the catkin. *Salicaceae*
    16. Leaves pinnately lobed. *Fagaceae*
    16. Leaves not lobed, serrate. *Betulaceae*
17. Ovary appearing to be inferior; leaves silvery-scurfy. *Elaeagnaceae*
17. Ovary conspicuously superior; leaves not silvery-scurfy (18)
    18. Carpel solitary; fruit plumose. *Rosaceae*
    18. Carpels 2, or more; fruit not plumose (19)
19. Plants trees. *Ulmaceae*
19. Plants shrubs (20)
    20. Flowers subtended by a whorl of bracts, mostly perfect. *Polygonaceae*
    20. Flowers not subtended by a whorl of bracts, usually imperfect. *Chenopodiaceae*

Group 2. Plants herbaceous, or at most with a woody base.

1. Ovary inferior (2)
1. Ovary, or ovaries superior (7)
    2. Ovary with one locule (3)
    2. Ovary with 2-5 locules (4)
3. Flowers solitary. *Aizoaceae*
3. Flowers in cymes, or panicles. *Rubiaceae*
    4. Flowers in umbels. *Umbelliferae*
    4. Flowers never in umbels (5)
5. Inflorescence a head. *Compositae*
5. Inflorescence not a head (6)
    6. Leaves alternate. *Santalaceae*
    6. Leaves opposite. *Valerianaceae*
7. Pistils several to many in each flower. *Ranunculaceae*
7. Pistil 1-3 in each pistillate flower (8)

8. Plants submerged, or floating aquatics. *Ceratophyllaceae*
8. Plants terrestrial, sometimes growing in wet soil (9)
9. Perianth lacking entirely, the whorl of bracts beneath the flowers resembling a hypanthium. *Euphorbiaceae*
9. Perianth present (10)
10. Flowers perigynous (11)
10. Flowers hypogynous (13)
11. Leaves opposite. *Nyctaginaceae*
11. Leaves alternate (12)
12. Corolla present. *Primulaceae*
12. Corolla lacking. *Rosaceae (Sanguisorba)*
13. Plants with milky juice. *Papaveraceae*
13. Plants without milky juice (14)
14. Style and stigma single; stems with stinging hairs. *Urticaceae*
14. Styles and stigmas 3, or more; stems not as above (15)
15. Ovules more than 1. *Caryophyllaceae*
15. Ovules solitary (16)
16. Flowers borne in a cup-shaped whorl of bracts. *Polygonaceae*
16. Flowers not borne in a whorl of bracts (17)
17. Plants with a sheath of stipules (ocrea) above each node. *Polygonaceae*
17. Plants lacking an ocrea (18)
18. Perianth mostly with 6 segments. *Polygonaceae*
18. Perianth with 1, 4, or 5 segments (19)
19. Bracts subtending flowers scarious, usually awn-tipped; plants not scurfy. *Amaranthaceae*
19. Bracts subtending flowers not scarious, not awn-tipped; plants usually scurfy. *Chenopodiaceae*

Group 3: Perianth consisting of petals and sepals; petals united at least slightly, or with 2 petals united in *Leguminosae*.

1. Ovary inferior, or partly so (2)
1. Ovary superior (9)
2. Stamens united by their anthers (3)
2. Stamens not united (5)
3. Plants with tendrils. *Curcurbitaceae*
3. Plants without tendrils (4)
4. Inflorescence a head. *Compositae*
4. Inflorescence not a head. *Campanulaceae*

5. Stamens 3. *Valerianceae*
5. Stamens 4-5 (6)
    6. Inflorescence-cone shaped, subtended by long stout spines; leaves prickly. *Dipsacaceae*
    6. Inflorescence not as above; leaves not prickly (7)
7. Shrubs. *Caprifoliaceae*
7. Herbs (8)
    8. Stems and leaves with milky juice. *Apocynaceae*
    8. Stems and leaves without milky juice. *Rubiaceae*
9. Stamens more than 5 (10)
9. Stamens 5, or fewer (15)
    10. Petals united (11)
    10. Petals not united, or with 2 petals united in *Leguminosae* (12)
11. Pistils more than 1; stamens twice as many as the petals. *Crassulaceae*
11. Pistil one in each flower; stamens the same number as the petals. *Pyrolaceae*
    12. Corolla irregular (13)
    12. Corolla regular (14)
13. Corolla papilionaceous. *Leguminosae*
13. Corolla irregular, but not papilionaceous. *Fumariaceae*
    14. Leaves simple; stamens numerous. *Malvaceae*
    14. Leaves compound; stamens 10. *Oxalidaceae*
15. Plants yellow, or whitish (16)
15. Plants green (17)
    16. Flowers regular; slender trailing vines. *Cuscutaceae*
    16. Flowers irregular; stems erect, not trailing, or twining. *Orobanchaceae*
17. Corolla irregular (sometimes only slightly so) (18)
17. Corolla regular (22)
    18. Ovary with 1 ovule per locule (19)
    18. Ovary with more than 1 ovule per locule (20)
19. Corolla strongly irregular: stems square. *Labiatae*
19. Corolla only slightly irregular; stems round. *Verbenaceae*
    20. Ovary 4-lobed. *Boraginaceae (Echium)*
    20. Ovary not 4-lobed (21)
21. Plants aquatic, floating. *Lentibulariaceae*
21. Plants terrestrial, or sometimes in wet areas, but never floating aquatics. *Scrophulariaceae*
    22. Plants with milky juice; pistils 2, separate at base, united by their stigmas and/or their styles at the top (23)
    22. Plants without milky juice; pistil 1 (24)
23. Stems branched; corolla campanulate. *Apocynaceae*

23. Stems not branched; corolla rotate usually with reflexed lobes. *Asclepiadaceae*
    24. Stamens opposite the corolla lobes. *Primulaceae*
    24. Stamens alternate with the the corolla lobes (25)
25. Corolla small (2-4 mm long); leaves parallel-veined, or nearly so. *Plantaginaceae*
25. Corolla larger; leaf veins not parallel (26)
    26. Ovary 4-lobed. *Boraginaceae*
    26. Ovary not 4-lobed (27)
27. Style 3-cleft. *Polemoniaceae*
27. Style not 3-cleft (28)
    28. Ovary with one locule (29)
    28. Ovary with 2, or more locules (30)
29. Leaves whorled; style 1; plants mostly glabrous. *Gentianaceae*
29. Leaves not whorled; styles 2, or if 1, then 2-cleft; plants mostly pubescent. *Hydrophyllaceae*
    30. Stems prostrate. *Convolvulaceae*
    30. Stems erect (31)
31. Styles 2, or if 1 then style divided at its tip. *Hydrophyllaceae*
31. Style 1, not divided (32)
    32. Stamens 2. *Scrophulariaceae*
    32. Stamens more than 2 (33)
33. Flowers irregular, or if slightly regular then stamens 5, or 2. *Scrophulariaceae*
33. Flowers regular, of if slightly irregular then leaves coarsely dentate to lobed. *Solanaceae*

Group 4: Perianth consisting of petals and sepals; stamens numerous, more than twice as many as petals; petals not united. (Numbers of petals and stamens can be quite variable in *Lythraceae*).

1. Ovary inferior, or partly so (2)
1. Ovary, or ovaries superior (6)
    2. Petals numerous; stems thick and succulent. *Cactaceae*
    2. Petals few; stems not thick, not succulent (3)
3. Ovary partly inferior (4)
3. Ovary wholly inferior (5)
    4. Leaves opposite. *Saxifragaceae*
    4. Leaves alternate. *Rosaceae*

5. Plants woody. *Rosaceae*
5. Plants herbaceous. *Loasaceae*
    6. Plants trees, or shrubs. *Rosaceae*
    6. Plants herbaceous, or woody only at the base (7)
7. Sepals 2 (8)
7. Sepals more than 2 (9)
    8. Petals dark brownish-red. *Papaveraceae (Roemeria)*
    8. Petals white to pink. *Portulacaceae*
9. Plants with milky-orange juice; stems and leaves prickly. *Papaveraceae (Argemone)*
9. Plants not as above (10)
    10. Filaments united into a tube around the pistil. *Malvaceae*
    10. Filaments not united into a tube (11)
11. Stamens attached to the margin of a hypanthium (12)
11. Stamens attached at the base of the ovary, or at the base of a cluster of ovaries (13)
    12. Hypanthium 8-12 ribbed; pistil 1; fruit a capsule *Lythraceae*
    12. Hypanthium not ribbed; pistils 1-many; fruit never a capsule. *Rosaceae*
13. Leaves glandular-punctate. *Guttiferae*
13. Leaves not glandular-punctate. *Ranunculaceae*

Group 5: Perianth of petals and sepals; petals not united, or united only at the top in *Fumariaceae*; stamens not more than twice as many as the petals, or flowers imperfect. (Numbers of petals and stamens can be quite variable in *Lythraceae*).

1. Flowers with more than 1 pistil (2)
1. Flowers with a single pistil (5)
    2. Plants succulent, fleshy. *Crassulaceae*
    2. Plants not succulent (3)
3. Flowers 3-merous. *Limnanthaceae*
3. Flowers 5-merous (4)
    4. Stamens inserted on the edge of a hypanthium; ovary perigynous. *Rosaceae*
    4. Stamens inserted at the base of the ovary, hypanthium lacking; ovary hypogynous. *Ranunculaceae*
5. Styles 2-5, distinct to near the base (6)
5. Style 1, sometimes lobed, or divided at the apex, or represented only by 3 feathery stigmas (17)

6. Plants trees, or shrubs (7)
6. Plants herbaceous (11)
7. Leaves scale-like. *Tamaricaceae*
7. Leaves not scale-like (8)
8. Ovary inferior (9)
8. Ovary superior (10)
9. Stamens 5; styles 2. *Saxifragaceae*
9. Stamens 10; styles 5. *Rosaceae*
10. Leaves alternate. *Anacardiaceae*
10. Leaves opposite. *Aceraceae*
11. Ovary inferior, sometimes only partly so (12)
11. Ovary superior (13)
12. Inflorescence an umbel. *Umbelliferae*
12. Inflorescence not an umbel. *Saxifragaceae*
13. Leaves opposite. *Caryophyllaceae*
13. Leaves alternate (14)
14. Sepals 2. *Portulaceae*
14. Sepals more than 2 (15)
15. Hypanthium present. *Saxifragaceae*
15. Hypanthium absent (16)
16. Flowers violet, purple, bluish, or yellow. *Linaceae*
16. Flowers white, or whitish. *Caryophyllaceae*
17. Ovary inferior (18)
17. Ovary superior (may appear to be inferior if it is enclosed within a floral tube) (21)
18. Plants herbaceous (19)
18. Plants woody, shrubs (20)
19. Flowers 4-merous. *Onagraceae*
19. Flowers 5-merous. *Saxifragaceae*
20. Leaves opposite; flowers in a cyme; stamens 4. *Cornaceae*
20. Leaves alternate; flowers in racemes, or solitary; stamens 5. *Saxifragaceae*
21. Plants trees, or shrubs (22)
21. Plants herbaceous (27)
22. Flowers irregular, papilionaceous. *Leguminosae*
22. Flowers regular (23)
23. Leaves compound with 2, or more leaflets (24)
23. Leaves simple, sometimes deeply divided, or parted, or scale-like (25)
24. Leaves opposite, deciduous; plants trees. *Oleaceae*
24. Leaves alternate, persistent; plants shrubs. *Berberidaceae*

25. Leaves scale-like. *Tamaricaceae*
25. Leaves broad, not scale-like (26)
    26. Stamens opposite the petals; leaves alternate. *Rhamnaceae*
    26. Stamens alternate with the petals, or more numerous than the petals; leaves opposite. *Celastraceae*
27. Sepals 2, or 3 (28)
27. Sepals 4, 5, or more (33)
    28. Leaves with sheathing stipules. *Polygonaceae*
    28. Leaves without sheathing stipules (29)
29. Flowers strongly irregular. *Fumariaceae*
29. Flowers regular (30)
    30. Flowers borne in a whorl of bracts. *Polygonaceae*
    30. Flowers not borne in a whorl of bracts (31)
31. Flowers regular (32)
31. Flowers strongly irregular. *Fumariaceae*
    32. Stems 4-angled; hypanthium present. *Lythraceae*
    32. Stems not 4-angled; hypanthium absent. *Portulaceae*
33. Flowers irregular (34)
33. Flowers regular (35)
    34. Flowers papilionaceous, borne in clusters. *Leguminosae*
    34. Flowers not papilionaceous, solitary. *Violaceae*
35. Leaves compound, or appearing so (36)
35. Leaves simple (40)
    36. Stamens dimorphic, 4 long and 2 short (37)
    36. Stamens all the same size (38)
37. Stamens dimorphic with 4 long and 2 short. *Cruciferae*
37. Stamens not dimorphic. *Capparidaceae*
    38. Leaves pinnately divided. *Zygophyllaceae*
    38. Leaves palmately lobed (39)
39. Flowers yellow. *Oxalidaceae*
39. Flowers white, pink, or lavender. *Geraniaceae*
    40. Sepals and petals 4; stamens 6. *Cruciferae*
    40. Sepals and petals 5; stamens 5-10 (41)
41. Stipules present; leaves palmately lobed. *Geraniaceae*
41. Stipules absent; leaves not palmately lobed (42)
    42. Flowers pink; inflorescence secund. *Pyrolaceae*
    42. Flowers bluish, or yellow; inflorescence not secund. *Linaceae*

Aceraceae

Acer

1. Leaves compound, 3- to 5-foliate; terminal leaflet stalked. *A. negundo* var. *interior*
1. Leaves simple, palmately lobed, if trifoliate then leaflets not stalked (2)
    2. Sinuses of leaf lobes broad; margins of lobes entire, or coarsely dentate; petals lacking. *A. grandidentatum*
    2. Sinuses of the leaf lobes narrowly acute; margins of lobes sharply and finely doubly serrate; petals generally present. *A. glabrum var. glabrum* = *A. glabrum var. tripartitum*

Aizoaceae

Sesuvium verrucosum

Amaranthaceae

Amaranthus

1. Flower clusters found only in the axils of leaves (2)
1. Flower clusters found in both the leaf axils and on the tips of the stems (3)
    2. Leaf blades terminated by a short stiff spine. *A. albus*
    2. Leaf blades lacking a spine. *A. blitoides*
3. Leaf margins entire; plants glabrous to puberulent. *A. palmeri*
3. Leaf margins crisped to undulate; plants villous. *A. retroflexus*

Anacardiaceae

1. Petals with few soft hairs on their inner surface; fruit reddish-orange. *Rhus*
1. Petals glabrous; fruit white, or yellowish, glabrous, or almost so. *Toxicodendron* ***(Poison Ivy!)***

Rhus

1. Leaves less than 6 cm long, with 3 leaflets. *R. aromatica* var. *trilobata*
1. Leaves 10-30 cm long with 7-9 leaflets. *R. glabra*

Toxicodendron rydbergii

Apocynaceae

Apocynum

1. Corolla greenish white, not much longer than the calyx. *A. cannabinum.*
1. Corolla pink, twice as long as the calyx. *A. androsaemifolium*

Asclepiadaceae

Asclepias

1. Corolla lobes erect, or spreading, not reflexed. *A. asperula*
1. Corolla lobes conspicuously reflexed (2)
    2. Plants glabrous; leaves narrowly lanceolate. *A. incarnata*
    2. Plants pubescent; leaves broadly lanceolate to almost ovate. *A. speciosa*

Berberidaceae

Mahonia

1. Plants less than 3 dm tall, with few leaves. *M. repens*
1. Plants more than 1 m tall, with many leaves. *M. aquifolium*

Betulaceae

1. Bark grey; pistillate catkins cone-like. *Alnus*
1. Bark reddish; pistillate catkins not cone-like. *Betula*

Alnus incana

Betula

1. Plants trees; leaves with 10-40 teeth on each margin; riparian habitats at low to mid-elevations. *B. occidentalis*
1. Plants shrubs; leaves with 10, or fewer teeth on each margin. Spruce-fir communities at high elevations. *B. glandulosa*

Boraginaceae

1. Corolla irregular; style 2-cleft at the tip. *Echium*
1. Corolla regular; style not as above (2)
    2. Ovary merely shallow-lobed; style lacking; stigma enlarged and often as broad as the ovary. *Heliotropium*
    2. Ovary deeply 4-lobed; style present; stigma small (3)

3. Nutlets with hooked, or barbed prickles on their back, margin, or apex (4)
3. Nutlets without hooked, or barbed prickles (6)
    4. Nutlets densely and uniformly covered with barbed prickles, prickles not restricted to a definite margin of the nutlets. *Cynoglossum*
    4. Nutlets with prickles confined to a definite margin, or sometimes with only a few small surface prickles (5)
5. Pedicels erect, or nearly so; style protruding well beyond the surface of the nutlets. *Lappula*
5. Pedicels reflexed in fruit; style usually not extending beyond the surface of the nutlets. *Hackelia*
    6. Stems with long vertical ridges possessing stiff downward pointing bristles. *Asperugo*
    6. Stems not as above (7)
7. Corolla blue, or reddish when young (8)
7. Corolla white, greenish-white, yellow, or orange (9)
    8. Limb of corolla abruptly spreading at right angles from the tube. *Myosotis*
    8. Limb of corolla gradually tapering, like a funnel, from a short tube, or from an inflated throat. *Mertensia*
9. Inflorescence not helicoid; nutlets attached to the receptacle only at their base. *Lithospermum*
9. Inflorescence helicoid; nutlets attached to the receptacle along their ventral surface, not at their base (10)
    10. Corolla yellow, or orange, never bi-colored. *Amsinkia*
    10. Corolla white, or pale yellow, may be bi-colored with a yellow center (11)
11. Plants erect annuals, or mat-forming perennials. *Cryptantha*
11. Plants prostrate annuals (in our species). *Plagiobothrys*

Amsinkia menziesii

Asperugo procumbens

Cryptantha

1. Plants slender erect annuals (2)
1. Plants mat-forming perennials (5)
    2. Surface of one, or more nutlets with minute spines, or small bumps (granular) (3)
    2. Surface of all nutlets smooth (4)
3. Nutlets all the same size with minute spines. *C. scoparia*
3. Nutlets with one larger than the other three and bumpy. *C. kelseyana*

4. Nutlets with the ventral groove only on one margin. *C. affinis*
4. Nutlets with the ventral groove positioned centrally *C. torreyana*

5. Corolla tube elongate, distinctly longer than the calyx. *C. flavoculata*
5. Corolla tube short, equal to, or shorter than the calyx. *C. humilis* var. *nana*

Cynoglossum officinale

Echium vulgare

Hackelia

1. Corolla white with pale blue throat; throat with five fringed glands. *H. patens*
1. Corolla blue to pinkish, often with a yellowish throat; glands on throat not fringed (2)
   2. Corolla 4-7 mm wide; stems 1-3; flowers numerous. *H. floribunda*
   2. Corolla 3-5 mm wide; stems numerous; flowers few. *H. micrantha (may = H. floribunda)*

Heliotropium curassavicum

Lappula occidentalis var. cupulata

Lithospermum

1. Plants slender annuals; flowers white. *L. arvense*
1. Plants perennial from a woody base; flowers yellow, or greenish-yellow. *L. ruderale*

Mertensia

1. Plants more than 4 dm tall; flowering in late spring/summer (2)
1. Plants less than 4 dm tall; flowering in early spring (3)
   2. Limb of the corolla conspicuously longer than the tube; calyx 3-8 mm long. *M. arizonica*
   2. Limb of the corolla shorter than the tube, or equal to it; calyx 1.5-3.0 mm long. *M. ciliata*
3. Filaments borne deep within the corolla tube, the anthers not protruding from the tube. *M. brevistyla*
3. Filaments borne near the throat of the corolla tube, the anthers extending out beyond the tube. *M. oblongifolia*

Myosotis scorpioides

Plagiobothrys

1. Sepals 3-8 mm long; plants of wet, saline/salt-desert shrub communities. *P. leptocladus*
1. Sepals 1-1.5 (2) mm long; plants growing in sagebrush to mixed-conifer types. *P. scouleri* var. *penicillatus*

Cactaceae

Opuntia

1. Fruits fleshy, reddish-purple. *O. macrorhiza*
1. Fruits dry, tan (2)
    2. Pads 2-8 cm long, 1.5–3.5 cm wide; joints easily separating. *O. fragilis*
    2. Pads 7-15 cm long, 4-12 dm wide; joints not separating. *O. erinacea* = *O. polycantha*

Callitrichaceae

Callitriche heterophylla

Campanulaceae

Downingia laeta

Cannabinaceae

1. Plants climbing vines. *Humulus*
1. Plants erect herbs, not vines. *Cannabis*

Cannabis sativa

Humulus lupulus

Capparidaceae

Cleome

1. Flowers pink to purple. *C. serrulata*
1. Flowers yellow. *C. lutea*

Caprifoliaceae

1. Leaves pinnately compound. *Sambucus*
1. Leaves simple (2)

2. Corolla with a short blunt spur. *Lonicera*
2. Corolla lacking a spur. *Symphoricarpos*

Lonicera

1. Flowers white to pink, fading to creme. *L. tatarica*
1. Flowers yellow (2)
   2. Corolla glandular-hairy; fruit black. *L. involucrata*
   2. Corolla glabrous; fruit red. *L. utahensis*

Sambucus

1. Inflorescence flat, umbel-like; fruit purple with a white coating; low to mid-elevations. *S. caerulea*
1. Inflorescence elongated, panicle-like; fruit red; high elevations. *S. racemosa* var. *microbotrys*

Symphoricarpos

1. Corolla 10-18 mm long, with a short tube. *S. longiflorus*
1. Corolla less than 10 mm long, campanulate, without a tube. *S. oreophilus* var. *utahensis*

Caryophyllaceae

1. Leaves with prominent scarious stipules. *Spergularia*
1. Leaves without stipules (2)
   2. Sepals distinct to the base of the calyx, or nearly so (3)
   2. Sepals united, forming a tube that is usually longer than the calyx lobes (5)
3. Flowers in umbellate clusters. *Holosteum*
3. Flowers solitary in the leaf axils, or cymose (4)
   4. Petals deeply cleft, or parted. *Stellaria*
   4. Petals entire, or only shallowly notched. *Arenaria*
5. Flowers all staminate. *Silene*
5. Flowers with both stamens and pistils, or only pistillate (6)
   6. Styles 3-5. *Silene*
   6. Styles 2 (7)
7. Petals 2-25 mm long; leaves linear. *Dianthus*
7. Petals 30-40 mm long; leaves lanceolate to ovate. *Saponaria*

Arenaria

1. Leaves elliptical to lanceolate. *A. lateriflora* var. *glabrescens*
1. Leaves linear to awl-shaped. *A. fendleri*

Dianthus armeria

Holosteum umbellatum

Saponaria

1. Plants robust perennials. *S. officinalis*
1. Plants slender annuals. *S. vaccaria*

Silene = Lychnis

1. Petals 5-9 mm long. *S. menziesii*
1. Petals 12-36 mm long (2)
    2. Petals 23-36 mm long and deeply 2-lobed. *S. latifolia*
    2. Petals 12-24 mm long and only shallowly 2-lobed (3)
3. Stems usually 1, rarely 2, or 3, unbranched. *S. drummondii*
3. Stems many from a much-branched woody caudex. *S. douglasii*

Spergularia

1. Sepals more than 4 mm long; plants from a woody caudex. *S. media*
1. Sepals less than 4 mm long; plants from a slender tap-root. *S. rubra*

Stellaria

1. Stem and inflorescence glandular-pubescent. *S. jamesiana*
1. Stem and inflorescence glabrous, or pubescent, but not glandular (2)
    2. Plants perennial; all leaves sessile. *S. longipes* var. *longipes*
    2. Plants annual; lower leaves with petioles (3)
3. Flowers axillary; stems procumbent. *S. media*
3. Flowers in terminal cymes; stems erect, or ascending. *S. nitens*

Celastraceae

Pachystima myrsinites

Ceratophyllaceae

Ceratophyllum demersum

Chenopodiaceae

1. Leaves scale-like; stems jointed and fleshy (2)
1. Leaves not scale-like; stems not jointed, nor fleshy (4)
    2. Branches alternate; plants with woody bases. *Allenrolfea*
    2. Branches opposite; plants herbaceous throughout (3)

3. Plants annuals. *Salicornia*
3. Plants perennials. *Sarcocornia*
4. Leaves terminated by a weak curved bristle. *Halogeton*
4. Leaves not terminating in a curved bristle (5)
5. Leaves gradually tapering to a stiff spine. *Salsola*
5. Leaves not spine-tipped (6)
6. Plants woody shrubs (7)
6. Plants herbaceous (9)
7. Leaves terete, fleshy. *Sarcobatus*
7. Leaves not terete, not fleshy (8)
8. Plants spinescent. *Grayia*
8. Plants not spinescent. *Atriplex*
9. Plants dichotomously branched. Monolepis
9. Plants not dichotomously branched. Atriplex
10. Flowers subtended by small bracts. *Suaeda*
10. Flowers without bracts (12)
11. Fruiting calyx with wings, or with hooked spines. *Bassia*
11. Fruiting calyx without wings, or spines. *Chenopodium*

Allenrolfea occidentalis

Atriplex
1. Plants woody (2)
1. Plants herbaceous (3)
2. Plants with thorns. *A. confertifolia*
2. Plants without thorns. *A. canescens var. canescens*
3. Seeds dimorphic, brown and black and of different size (4)
3. Seeds not dimorphic, brown, of same size (8)
4. Fruiting bracts orbicular to suborbicular (5)
4. Fruiting bracts triangular, broadly triangular, triangular-ovate, or rhombic (6)
5. Leaves hastately lobed, triangular. *A. micrantha*
5. Leaves not hastately lobed, not triangular. *A. hortensis*
6. Lower leaves ovate with dentate margins, sessile, or short-petioled. *A. rosea*
6. Lower leaves lanceolate, rhombic, triangular, or hastate with margins dentate, or entire, petiolate (7)
7. Lower leaves lanceolate; fruiting bracts rhomboid to ovate. *A. patula* var. *patula*
7. Lower leaves hastate, triangular, rhomboid; fruiting bracts triangular. *A. prostrata*

8. Fruiting bracts with 3 very small teeth at the apex. *A. truncata*
8. Fruiting bracts with a dentate foliaceous margin well below the apex. *A. argentea* ssp. *argentea*

Bassia

1. Calyx with hooked spines (in fruit). *B. hyssopifolia*
1. Calyx without spines (2)
   2. Plants perennials with a woody base. *B. americana* syn. *Kochia americana*
   2. Plants annuals without a woody base. *B. scoparia* syn. *Kochia scoparia*

Chenopodium

1. Stem single, unbranched. *C. atrovirens*
1. Stems several, branched (2)
   2. Flowers in tight globose clusters. *C. capitatum*
   2. Flowers in elongated spikes, or panicles (3)
3. Stems prostrate (4)
3. Stems erect (5)
   4. Leaves green on both upper and lower surface; stems usually reddish. *C. rubrum*
   4. Leaves glabrous on the upper surface, white to gray on the lower surface. *C. glaucum*
5. Leaves with large divaricate, acute lobes. *C. simplex*
5. Leaves entire to shallowly sinuate-dentate (6)
   6. Leaf blades almost as broad as long. *C. fremontii*
   6. Leaf blades one-half to four times longer than broad. *C. album*

Grayia spinosa

Halogeton glomeratus

Monolepis nuttaliana

Salicornia rubra

Salsola tragus

Sarcobatus vermiculatus

Sarcocornia utahensis

Suaeda

1. Plants woody perennials. *S. nigra var. nigra*
1. Plants herbaceous annuals (2)
   2. Stems erect, stiff. *S. calceoliformis*
   2. Stems spreading, flexuous. *S. occidentalis*

Compositae

1. Heads with ray flowers only (inner immature flowers may resemble disk flowers); plants with milky juice. *Key 1*
1. Heads with both ray and disk flowers, or with disk flowers only; plants without milky juice (2)
   2. Heads with disk flowers only; ray flowers absent, or vestigial. *Key 2*
   2. Heads with both ray flowers and disk flowers; ray flowers sometimes small (3)
3. Pappus of capillary bristles. *Key 3*
3. Pappus of awns, scales, or lacking (4)
   4. Pappus lacking. *Key 4*
   4. Pappus present. *Key 5*

Key 1. Heads with ray flowers only; plants with milky juice.

1. Pappus at least in part of plumose bristles (2)
1. Pappus of capillary bristles, or scales (4)
   2. Taproots black. *Scorzonera*
   2. Taproots not black (3)
3. Pappus of narrow translucent scales each terminated by a white plumose bristle. *Microseris*
3. Pappus of plumose bristles only, scales absent. *Tragopogon*
   4. Pappus of 2-3 series of un-awned scales. *Cichorium*
   4. Pappus of capillary bristles (5)
5. Ovaries flattened (6)
5. Ovaries not flattened (7)
   6. Ovary and pappus separated by a narrow beak. *Lactuca*
   6. Ovary not as above. *Sonchus*
7. Corolla pink, or purplish. *Lygodesmia*
7. Corolla yellow, or yellowish, white, or crème colored (8)
   8. Heads solitary on scapose, or subscapose peduncles; leaves mostly basal, or with a few reduced stem leaves (9)
   8. Heads numerous, not solitary on scapose peduncles; leaves not all basal, the stems leafy (10)

9. Ovaries with 4-5 ribs; involucral bracts in two whorls. *Taraxacum*
9. Ovaries with 10 ribs, or nerves; involucral bracts in several whorls. *Agoseris*
    10. Pappus tan to brown; plants with rhizomes. *Hieracium*
    10. Pappus white, or whitish; plants with taproots. *Crepis*

Key 2. Heads with disk flowers only; ray flowers absent, or inconspicuous. (*Erigeron compositus* is often discoid)

1. Involucral bracts spiny; involucre becoming a bur (2)
1. Involucral bracts and involucre not as above (3)
    2. Involucres covered with hooked spines. *Xanthium*
    2. Involucres with straight spines. *Ambrosia*
3. Pappus of capillary bristles (4)
3. Pappus lacking, or if present then not of capillary bristles (18)
    4. Leaves whorled with 3-4 leaves per node. *Eupatorium*
    4. Leaves not whorled (5)
5. Leaves spinescent, usually with spiny teeth, or lobes (6)
5. Leaves not spinescent (8)
    6. Pappus bristles plumose. *Cirsium*
    6. Pappus bristles not plumose, with short stiff bristles (7)
7. Heads nodding; stems and leaves green. *Carduus*
7. Heads not nodding; stems and leaves gray to white-tomentose. *Onopordum*
    8. Receptacle with dense bristles, or narrow chaffy scales between the disk flowers (9)
    8. Receptacle naked, or at most short-hairy, never with dense bristles, or scales (10)
9. Flowers purple. *Arctium*
9. Flowers yellow. *Centaurea*
    10. Involucral bracts scarious, or hyaline (11)
    10. Involucral bracts not scarious, not hyaline (12)
11. Plants matt-forming (in our species). *Antennaria*
11. Plants not matt-forming. *Gnaphalium*
    12. Plants woody shrubs (13)
    12. Plants herbaceous (14)
13. Involucres tomentose. *Tetrydymia*
13. Involucres not tomentose. *Brickelia*
    14. Plants annuals (15)
    14. Plants perennials (16)
15. Leaves with few irregular teeth, margins ciliate. *Conyza*
15. Leaves irregularly pinnatifid. *Senecio*

16. Involucral bracts in more, or less vertical, overlapping whorls. *Chrysothamnus*
16. Involucral bracts not in vertical whorls (17)

17. Plants resinous. *Happlopappus*
17. Plants not resinous. *Brickelia*

18. Receptacles with stiff bristles, or chaffy scales among the flowers (19)
18. Receptacles naked, or short-hairy (19)

19. Receptacles densely bristly. *Centauria*
19. Receptacles with chaffy scales (20)

20. Leaves opposite (21)
20. Leaves alternate, or basal (22)

21. Inflorescence large and showy on long peduncles. *Bidens*
21. Inforescence small, sessile. *Iva*

22. Plants glandular; receptacles not conical. *Madia*
22. Plants not glandular; receptacles conical. *Rudbeckia*

23. Pappus none (24)
23. Pappus present (25)

24. Receptacles conic; inflorescence a corymb. *Sphaeromeria*
24. Receptacles flat; inflorescence not a corymb. *Artemisia*

25. Receptacle chaffy. *Bidens*
25. Receptacle not chaffy, sometimes hairy (26)

26. Flowers yellow (27)
26. Flowers white to pink (28)

27. Leaves simple. *Grindelia*
27. Leaves deeply pinnatifid. *Chamomilla*

28. Pappus plumose. *Stephanomeria*
28. Pappus of scales. *Chaenactis*

Key 3. Heads with both ray flowers and disk flowers; ray flowers sometimes small; pappus of capillary bristles. (*Erigeron compositus* is often discoid)

1. Rays white, pink, violet, or purple, not yellow (2)
1. Rays yellow, or orange-yellow (5)

2. Rays about as long as the pappus. *Conyza*
2. Rays conspicuously longer than the pappus (3)

3. Involucral bracts the same size and length, rays usually less than 2 mm wide. *Erigeron*
3. Involucral bracts usually strongly graduated with some bracts long and some much shorter; rays wider (4)

4. Plants from a taproot. *Machaeranthera*
4. Plants with rhizomes. *Aster*

5. Leaves opposite, at least the lower ones. *Arnica*
5. Leaves alternate throughout (6)
    6. Plants shrubs. *Chrysothamnus*
    6. Plants herbaceous (7)
7. Involucral bracts in one whorl with a few smaller bracts on the stem below the involucre. *Senecio*
7. Involucral bracts in more than one whorl (8)
    8. Involucral bracts overlapping in distinct vertical rows. *Petradoria*
    8. Involucral bracts overlapping like shingles on a roof (9)
9. Plants annuals. *Conyza*
9. Plants perennials (10)
    10. Stems and leaves resinous-glandular (11)
    10. Stems and leaves not resinous-glandular. *Solidago*
11. Plants densely white-villous hairy. *Heterotheca*
11. Plants not as above. *Haplopappus*

Key 4. Heads with both ray flowers and disk flowers; ray flowers sometimes small; pappus lacking.

1. Rays white, sometimes with a yellow base (2)
1. Rays yellow (6)
    2. Receptacle not chaffy (3)
    2. Receptacle chaffy (5)
3. Leaves pinnately lobed; receptacle rounded. *Chrysanthemum*
3. Leaves pinnately dissected; receptacle elongated (4)
    4. Heads solitary. *Anthemis*
    4. Heads few to many. *Matricaria*
5. Heads numerous; plants perennial. *Achillea*
5. Heads solitary, or few; plants annual. *Anthemis*
    6. Receptacles not chaffy. *Sphaeromeria*
    6. Receptacle chaffy at least on the outer edge (7)
7. Plants annual, glandular-viscid above. *Madia*
7. Plants perennial, not glandular (8)
    8. Leaves variously dissected, or sagittate. *Balsamorhiza*
    8. Leaves with entire margins, never sagittate. *Viguirea*

Key 5. Heads with both ray flowers and disk flowers, ray flowers sometimes small; pappus of awns, or scales.

1. Receptacle chaffy (2)
1. Receptacle not chaffy, either naked, or with bristles (8)
    2. Receptacle with a row of chaffy scales between the ray flowers and the outer disk flowers. *Layia*

2. Receptacle chaffy throughout (3)
3. Pappus of awns only, scales absent (4)
3. Pappus at least in part of scales (5)
4. Awns with stiff downward pointing hairs. *Bidens*
4. Awns not as above. *Helianthus*
5. Ovaries very strongly flattened. *Helianthella*
5. Ovaries not flattened (6)
6. Pappus falling early. *Helianthus*
6. Pappus persistent (7)
7. Receptacle several times longer than wide. *Rudbeckia*
7. Receptacle only slightly rounded. *Wyethia*
8. Rays white. *Chrysanthemum*
8. Rays yellow, sometimes marked with purple (9)
9. Ray flowers strongly reflexed; herbaceous plants with single stems. *Helenium*
9. Ray flowers erect; mostly branched sub-shrubs (10)
10. Leaves pinnately divided. *Sphaeromeria*
10. Leaves not divided (11)
11. Leaves ovate-serrate; involucre strongly sticky-resinous. *Grindelia*
11. Leaves linear; involucre not sticky-resinous. *Gutierrezia*

Achillea millefolium ssp. *lanulosa*

Agoseris

1. Flowers brownish-orange; style more than half again as long as the body of the ovary. *A. aurantiaca* var. *aurantiaca*
1. Flowers yellow; style about one half as long as the body of the ovary (2)
2. Plants glabrous, or merely sparsely ciliate on the lower parts of leaves and petiole. *A. glauca* var. *glauca*
2. Plants pubescent, at least on the involucre, or just below it. *A. glauca* var. *laciniata*

Ambrosia

1. Plants annual. *A. acanthicarpa*
1. Plants perennial (2)
2. Pistillate heads with coarse spines. *A. tomentosa*
2. Pistillate heads without spines. *A. psilostachya*

Antennaria

1. Heads solitary. *A. dimorpha*
1. Heads 2-many (2)

2. Involucres mostly white, 7-10 mm long. *A. parvifolia*
2. Involucres mostly pink, 4-7 mm long. *A. microphylla*

Anthemis cotula

Arctium

1. Flowers numerous in a raceme; petiole base hollow *A. minus*
1. Flowers few in a loose corymb; petiole base solid. *A. lappa*

Arnica

1. Cauline leaves with long petioles. *A. cordifolia*
1. Cauline leaves sessile (2)
   2. Cauline leaves lanceolate. *A. longifolia*
   2. Cauline leaves ovate to ovate-lanceolate. *A. latifolia*

Artemisia

1. Plants herbs, often with woody bases (2)
1. Plants shrubs (4)
   2. Leaves glabrous, green. *A. dracunculus*
   2. Leaves finely puberulent to tomentose, grayish-white (3)
3. Leaves entire, lance-ovate, some lower leaves occasionally toothed, or lobed. *A. ludoviciana* var. *ludoviciana*
3. Leaves distinctly 5-lobed. *A. ludoviciana* var. *latiloba*
   4. Leaves linear to linear-spatulate, entire, or rarely tridentate at apex; meadows and along stream terraces. *A. cana*
   4. Leaves tridentate, or 3-parted; dry sites from low to high elevations (5)
5. Heads numerous in dense panicles; shrubs 0.5-2.0 meters high (6)
5. Heads few, usually racemose-spicate; small shrubs, usually less than 4 dm high. *A. nova var. nova*
   6. Flower clusters extending well beyond the body of stems and leaves. *A. tridentata* var. *vaseyana*
   6. Flower clusters imbedded within the body of stems and leaves (7)
7. Leaves 2 cm long, or more; plants of low to middle elevations. *A. tridentata* var. *tridentata*
7. Leaves less than 1.2 cm long; plants of mid- to high elevations. *A. tridentata var. wyomingensis*

Aster

1. Involucral bracts reflexed. *A. kingii*

1. Involucral bracts not reflexed (2)
    2. Involucre distinctly glandular. *A. integrifolius*
    2. Involucre not glandular (3)
3. Involucral bracts with soft green tips (4)
3. Involucral bracts with dry papery tips (8)
    4. Pubescence of stems in lines descending from the leaf bases. *A. hesperius*
    4. Pubescence of stems not restricted to lines of hairs (5)
5. Stem leaves more than 2 cm wide, auriculate clasping. *A. foliaceus*
5. Stem leaves less than 2 cm wide, not auriculate-clasping (6)
    6. Pubescence on the involucre course, stiff. *A. adscendens*
    6. Pubescence on the involucre soft, or absent (7)
7. Inflorescence with numerous heads; leaves mostly more than 7 times longer than wide. *A. eatonii*
7. Inflorescence with few heads; leaves mostly less than 7 times longer than wide. *A. spathulatus*
    8. Rays violet. *A. perelegans*
    8. Rays white. *A. engelmannii*

Balsamorhiza

1. Leaves entire, or nearly so, sagittate. *B. sagittata*
1. Leaves incised, or pinnately-parted, not sagittate (2)
    2. Leaf lobes 4.5-11.0 cm long. *B. macrophylla*
    2. Leaf lobes 1.5-3.0 cm long. *B. hookeri*

Bidens

1. Leaves pinnately compound. *B. frondosa*
1. Leaves simple (2)
    2. Corolla of the disk flowers 4-lobed; anthers not extending beyond the corolla tube. *B. comosa*
    2. Corolla of disk flowers 5-lobed; anthers barely extending beyond the corolla tube. *B. cernua*

Brickellia

1. Plants herbaceous; leaves with petioles. *B. grandiflora*
1. Plants woody, at least some stems with a woody base; leaves sessile, or nearly so. *B. microphylla var. watsonii*

Carduus nutans

Centaurea solstitialis

Chaenactis douglasii

Chamomilla suaveolens = *Matricaria matricarioides*

Chrysanthemum

1. Rays 1-2 cm long; involucre 7-10 mm long.
   C. leucanthemum
1. Rays 2-6 mm long; involucre 3-4.5 mm long.
   C. parthenium

Chrysothamnus

1. Twigs tomentose. *C. nauseosus*
1. Twigs glabrous, or puberulent (2)
   2. Leaves usually twisted. *C. viscidiflorus* var. *viscidiflorus*
   2. Leaves flat. *C. viscidiflorus var. lanceolatus*
   (other subspecific taxa within this genus are poorly defined and not consistent enough to be recognised)

Cichorium intybus

Cirsium

1. Heads 1.0-1.5 cm long. *C. arvense*
1. Heads 2-5 cm long (2)
   2. Stems winged, with decurrent leaf bases. *C. vulgare*
   2. Stems not winged. *C. undulatum*

Conyza canadensis

Crepis

1. Plants with a woody caudex, perennials (2)
1. Plants without a woody caudex, mostly annuals. *C. pulchra*
   2. Involucral bracts glabrous, or nearly so.
   C. acuminata ssp. *pleuriflora*
   2. Involucral bracts tomentose.
   C. intermedia

Erigeron

1. Plants annuals, or biennials without a woody caudex.
   E. glabellus
1. Plants perennials from a woody caudex, or rhizome (2)
   2. Heads discoid, or rays small and inconspicuous.
   E. compositus
   2. Heads with well defined disk and ray flowers (3)
3. Leaves palmately lobed, or parted. *E. compositus*
3. Leaves entire, or nearly so (4)

4. Stem leaves broadly lanceolate to ovate, of if narrowly linear then base of stems pulplish (5)
4. Stem leaves linear, spatulate, reduced, or lacking (9)

5. Rays 2-4 mm wide. *E. peregrinus* var. *angustifolius*
5. Rays about 1 mm wide (6)
6. Involucral bracts hairy, but not glandular. *E. glabellus*
6. Involucral bracts glandular (7)

7. Leaves glabrous, but with ciliate margins. *E. speciosusvar. macranthus*
7. Leaves hairy and/or glandular, not ciliate. *E. formosissimus*
8. Base of stems purplish. *E. ursinus*
8. Base of stems not purplish. *E. speciosus*

9. Pubescence of stems widely spreading, or reflexed. *E. pumilus*
9. Pubescence of stems ascending, or lacking (10)
10. Involucres villous with wooly, or spreading multicellular hairs (11)
10. Involucres without long spreading multicellular hairs. *E. arenarioides*

11. Basal leaves 3-nerved; rays about 20. *E. eatonii* var. *villosus*
11. Basal leaves 1-nerved; rays about 50. *E. engelma*

Eupatorium maculatum var. *bruneri*

Gnaphalium

1. Plants annual; involucre 3-4 mm long. *G. palustre*
1. Plants perennial; involucre 4-7 mm long. *G. microcephalum*

Grindelia squarrosa var. *serrulata*

Gutierrezia sarothrae

Haplopappus

1. Plants perennial herbs. *H. acaulis*
1. Plants low, branched, rounded-topped shrubs. *H. watsonii* var. *rydbergii*

Helenium autumnale

Helianthella uniflora

Helianthus

1. Plants perennial; disk flowers yellow. *H. nuttallii*

1. Plants annual; disk flowers reddish-brown to purplish. *H. annuus* ssp. *lenticularis*

Heterotheca villosa syn. *Chrysopsis villosa*

Hieracium scouleri

Iva
1. Leaves entire. *I. axillaris*
1. Leaves toothed. *I. xanthifolia*

Lactuca
1. Flowers blue, or violet. *L. tatarica* ssp. *pulchella*
1. Flowers yellow. *L. serriola*

Layia glandulosa

Lygodesmia grandiflora var. *dianthopsis*

Machaeranthera canescens

Madia glomerata

Matricaria maritima

Microseris nutans

Onopordum acanthium

Petradoria pumila

Rudbeckia occidentalis

Scorzonera laciniata

Senecio
1. Plants annual. *S. vulgaris*
1. Plants perennial (2)
    2. Stems equally leafy throughout; leaves about the same size and shape, or upper leaves slightly smaller (3)
    2. Stems with few upper leaves; upper leaves definitely much smaller and often of a different shape than lower leaves (6)
3. Stems somewhat prostrate, 1-3 dm tall. *S. fremontii*

3. Stems erect, 2-15 dm tall (4)
    4. Plants 2-4 dm tall; leaves pinnatifid, lobed, or incised. *S. eremophilus var. kingii*
    4. Plants 5-10 dm tall; leaves dentate, or serrate (5)
5. Leaf blades lanceolate. *S. serra* var. *serra*
5. Leaf blades triangular. *S. triangularis*
    6. Plants glabrous; riparian, wet, or meadow habitats. *S. hydrophilus*
    6. Plants villous to tomentose, not found in riparian, or wet meadow habitats (7)
7. Leaves pinnatifid, to pinnately lobed. *S. multilobatus*
7. Leaves entire to merely serrate (8)
    8. Rays 5 or fewer; involucral bracts 8, or fewer. *S. atratus*
    8. Rays 8 or more; involucral bracts 13, or more (9)
9. Leaves thick and succulent. *S. streptanthifolius*
9. Leaves not as above (10)
    10. Stems solitary, irregularly villose. *S. integerrimus*
    10. Stems several, tomentose. *S. canus*

Solidago

1. Involucres 8-12 mm long. *S. parryi*
1. Involucres less than 7 mm long (2)
    2. Lower leaves ciliate-margined. *S. multiradiata*
    2. Lower leaves not ciliate-margined (3)
3. Stems pubuerulent below the inflorescence. *S. canadensis*
3. Stems glabrous below the inflorescence (4)
    4. Stems glaucous. *S. gigantea*
    4. Stems not glaucous. *S. missouriensis*

Sonchus arvensis

Sphaeromeria diversifolia

Stephanomeria

1. Plants annuals from a tap-root. *S. exigua*
1. Plants perennials with a woody caudex (2)
    2. Stems and leavesa glabrous, or nearly so. *S. runcinata*
    2. Stems and leaves tomentose. *S. occulata*

Taraxacum officinale

Tetrydymia

1. Flowers in axillary clusters. *T. spinosa*

1. Flowers in terminal corymbose clusters. *T. canescens* (morphological features commonly used to define species in this genus such as the curvature of the spines are not consistent, but these two species seem to be easily separated.)

Tragopogon
1. Flowers yellow. *T. dubius*
1. Flowers purple. *T. porrifolius*

Viguiera multiflora var. *multiflora*

Wyethia amplexicaulis

Xanthium strumarium

Convolvulaceae

1. Stigmas as broad as long. *Cressa*
1. Stigmas more than twice as long as broad (2)
   2. Calyx enclosed by 2 large bracts; stigmas oblong. *Calystegia*
   2. Calyx not enclosed by bracts; stigmas linear. *Convolvulus*

Calystegia sepium

Convolvulus arvensis

Cressa truxillensis

Cornaceae

Cornus sericea var. *sericea*

Crassulaceae

Sedum
1. Leaves opposite. *S. debile*
1. Leaves alternate. *S. lanceolatum*

Cruciferae

1. Cauline leaves (at least some) auriculate, sometimes only slightly so (2)
1. Cauline leaves (if present) not auriculate (4)

2. Petals yellow; plants glabrous, or with simple hairs only. *Key 1*
2. Petals white, pink, lavender, chestnut, or purple, but not yellow (cream colored in *Camelina*); plants glabrous, or variously pubescent (3)

3. Plants glabrous, or with simple hairs only. *Key 2*
3. Plants pubescent with at least some malpighian, branched, or stellate hairs. *Key 3*
4. Petals yellow (5)
4. Petals white, pink, lavender, purple, or chestnut, but not yellow (6)

5. Plants glabrous, or with simple hairs only. *Key 4*
5. Plants pubescent with malpighian, branched, or stellate hairs. *Key 5*
6. Plants glabrous, or with simple hairs only. *Key 6*
6. Plants pubescent with at least some malpighian, branched, or stellate hairs. *Key 7*

Key 1. Petals yellow; cauline leaves auriculate (at least some, or sometimes only slightly so)

1. Fruits as wide as long (2)
1. Fruits more than twice as long as wide (3)
2. Fruits flattened in cross-section with a shallow notch at the tip. *Lepidium*
2. Fruits round in cross-section, not notched, but with a short elongate tip. *Camelina*

3. Uppermost cauline leaves falsely perfoliate-clasping. *Lepidium*
3. Uppermost cauline leaves not perfoliate-clasping, more than twice as long as broad (4)
4. Cauline leaves entire (lower leaves often crenate) (5)
4. Cauline leaves deeply toothed, and/or deeply lobed (6)

5. Fruiting pedicels recurved. *Isatis*
5. Fruiting pedicels ascending. *Conringia*
6. Stems angular in cross-section. *Barbarea*
6. Stems round in cross-section (7)

7. Flowers 6-9 mm long; fruits constricted between the seeds (sometimes only slightly so). *Brassica*
7. Flowers 1-3 mm long; fruits not constricted between the seeds. *Rorippa*

Key 2. Petals white, pink, lavender, or chestnut; cauline leaves auriculate (at least some, or only slightly so); stems and leaves glabrous, or with simple hairs only.

1. Leaves pinnately compound, or pinnatifid; plants aquatic, glabrous, or nearly so. *Nasturtium*
1. Leaves simple, entire, or merely toothed; plants terrestrial (2)
    2. Flowers chestnut to brown-purple, or purple. *Streptanthus*
    2. Flowers white, pink, or lavender (3)
3. Limb of petal 4-6 mm long; sepals 4-7 mm long. *Thelypodiopsis*
3. Limb of petal 2-3 mm long, or less; sepals 2-4 mm long (4)
    4. Fruit 10-30 times longer than wide, linear, or narrowly oblong (5)
    4. Fruit as wide, or wider than long. obcordate, ovate, or cordate (6)
5. Pedicels 8-12 mm long, erect. *Arabis*
5. Pedicels 2-7 mm long, spreading to ascending. *Thelypodium*
    6. Fruit conspicuously winged. *Thlaspi*
    6. Fruit not winged, or only slightly so. *Cardaria*

Key 3. Petals white, pink, or lavender (except in *Camelina* and *Arabis);* cauline leaves auriculate; herbage pubescent with malpighian, branched, or stellate hairs.

1. Fruits many times longer than wide (2)
1. Fruits less than 3 times longer than wide (3)
    2. Fruits subquadrangular in cross-section. *Halimolobos*
    2. Fruits terete, or flattened in cross-section. *Arabis*
3. Fruits triangular-obcordate, flattened in cross-section. *Capsella*
3. Fruits obovoid, round in cross-section, or nearly so. *Camelina*

Key 4. Flowers yellow; cauline leaves (if present) not auriculate; stems and leaves glabrous, or with simple hairs only.

1. Cauline leaves absent. *Draba*
1. Cauline leaves present (2)
    2. Cauline leaves hastately lobed. *Chlorocrambe*
    2. Cauline leaves not hastately lobed (3)
3. Cauline leaves entire, long and narrow. *Schoencrambe*
3. Cauline leaves lobed to deeply pinnatifid (4)

4. Fruits with an elongated style, sometimes only slightly differentialed from the fruit: petals often with dark veins. *Brassica*
4. Fruits without an elongated style; petals without dark veins. *Sisymbrium*

Key 5. Petals yellow; cauline leaves (if present) not auriculate; stems and leaves pubescent with malpighian, branched, or stellate hairs.

1. Leaves pinnately dissected, or compound. *Descurainia*
1. Leaves simple and entire, or merely toothed, or lobed (2)
   2. Cauline leaves lacking. *Draba*
   2. Cauline leaves present (3)
3. Fruits many times longer than wide. *Erysimum*
3. Fruits no more than 4-5 times longer than wide (4)
   4. Fruits more than twice as long as wide. *Draba*
   4. Fruits not as above (5)
5. Fruits flattened in cross-section. *Alyssum*
5. Fruits round in cross-section (6)
   6. Fruits with two distinct inflated lobes. *Physaria*
   6. Fruits not as above. *Lesquerella*

Key 6. Petals white, pink, lavender, purple, or chestnut; cauline leaves (if present) not auriculate; stems and leaves glabrous, or with simple hairs only.

1. Stems and leaves with simple glandular hairs. *Chorispora*
1. Stems and leaves glabrous, or with non-glandular hairs (2)
   2. Fruits with a stipe between the receptacle and the base of the ovary (3)
   2. Fruits sessile, lacking the stipe (4)
3. Stipe 2-7 mm long; mature fruits many times longer than wide. *Chlorocrambe*
3. Stipe 10-20(25) mm long; mature fruits about as wide as long. *Lunaria*
   4. Plants without cauline leaves; leaves often less than 10 mm long; scapes often less than 10 cm tall. *Draba*
   4. Plants with cauline leaves; leaves mostly more than 10 mm long; stems usually over 10 cm tall (5)
5. Fruits elliptical in outline. *Lepidium*
5. Fruits linear (6)
   6. Leaves compound. *Nasturtium*
   6. Leaves simple (7)
7. Leaves ovate. *Cardamine*

7. Leaves not ovate (7)
    8. Plants slender annuals. *Arabidopsis*
    8. Plants never annuals. *Arabis*

Key 7. Petals white, pink, lavender, or purple; cauline leaves (if present) not auriculate; stems and leaves pubescent with at least some malpighian, branched, or stellate hairs.

1. Leaves mostly basal with few (if any) cauline leaves; plants mostly less than 1 dm tall. *Draba*
1. Leaves mostly cauline; plants often more than1 dm tall (2)
    2. Petal blades more than 6 mm long; sepals saccate. *Hesperis*
    2. Petal blades less than 6 mm long; sepals not saccate (3)
3. Pedicels descending; fruits pendulous. *Arabis*
3 Pedicels spreading to ascending; fruits erect, or spreading-ascending (4)
    4. Pedicels less than 2 mm long. *Malcomia*
    4. Pedicels longer than 2 mm (5)
5. Fruits linear, round in x-section. *Arabidopsis*
5. Fruits lance-ovate, not round in x-section. *Draba*

Alyssum
1. Fruits glabrous. *A. desertorum*
1. Fruits stellate-pubescent. *A. alyssioides*

Arabidopsis thaliana

Arabis
1. Stems mostly solitary, sometimes 2-3 arising from a single rosette of leaves, but not caespitose (2)
1. Stems caespitose with several stems arising from a much-branched caudex, sometimes forming large mats (4)
    2. Fruits strictly ascending, appressed to and parallel with the rachis of the inflorescence. *A. hirsuta var. glabrata*
    2. Fruits either loosely ascending, not appressed to the rachis of the inflorescence, or spreading, pendulous, or reflexed (3)
3. Cauline leaf margins revolute; flowers pink to purple. *A. holboellii*
3. Cauline leaf margins not revolute; flowers white, yellow, or pink. *A. glabra* (includes *A. sparsiflora and A. drummondii)*
    4. Plants forming large mats (5)
    4. Plants not forming mats (7)
5. Fruiting pedicels 2-5 mm long; fruits secund. *A. lemmonii* (includes *A. lyallii*)

5. Fruiting pedicels 4-13 mm long; fruits not secund (6)
    6. Leaves coarsely stellate pubescent; limestone cliffs and soils at mid-elevations. *A. fernaldiana*
    6. Leaves without stellate pubescence; sub-alpine talus slopes and meadows. *A. microphylla var. microphylla*
7. Petals white; wet meadows and stream banks. *A. nuttallii*
7. Petals lavender to purple; dry, rocky soils. *A. lasiocarpa*

Barbarea vulgaris

Brassica nigra

Camelina microcarpa

Capsella bursa-pastoris

Cardamine
1. Leaves all simple. *C. cordifolia*
1. Leaves pinnately compound (at least lower ones) (2)
    2. Leaflets 3-5; petals 3-7 mm long. *C. breweri*
    2. Leaflets 6-11; petals 2-3 mm long. *C. pennsylvanica* = *C. oligosperma* (?)

Cardaria
1. Fruits cordate, or somewhat triangular in outline. *C. draba*
1. Fruits round in outline. *C. chalapensis*

Chlorocrambe hastatus

Chorispora tenella

Conringia orientalis

Descurainia
1. Fruits almost elliptical (2)
1. Fruits with parallel margins, not elliptical (3)
    2. Fruits ascending, appressed to the rachis of the inflorescence. *D. richardsonii*
    2. Fruits various, but not appressed to the rachis. *D. californica*
3. Fruits 4-15 mm long; upper leaves once-pinnate. *D. pinnata*
3. Fruits 14-28 mm long; upper leaves bi-, or tripinnate. *D. sophia*

Draba
1. Plants scapose, the leaves all basal (2)

1. Plants with 1-many cauline leaves in addition to the basal ones (6)
    2. Plants annual. *D. verna*
    2. Plants perennial (3)
3. Petals white (4)
3. Petals yellow (5)
    4. Fruits less than 7 mm long, elliptic to linear. *D. lonchocarpa* var. *exigua*
    4. Fruits more than 10 mm long, linear to narrowly elliptic. *D. lonchocarpa* var. *lonchocarpa*
5. Styles 1.0-2.5 mm long; petals 5-6 mm long. *D. burkei*
5. Styles usually less than 1 mm long; petals less than 5 mm long. *D. densifolia* var. *daviesae*
    6. Upper portion of stem (including pedicels) pubescent. *D. cuneifolia* var. *cuneifolia*
    6. Upper portion of stem glabrous (7)
7. Petals white. *D. reptans (may = D. cuneifolia)*
7. Petals yellow (8)
    8. Pedicels usually at least 2-7 times longer than the fruits. *D. nemorosa*
    8. Pedicels rarely longer than the fruits. *D. stenoloba* var. *nana*

Erysimum

1. Petals more than 13 mm long; sepals more than 8 mm long. *E. asperum* var. *purshii*
1. Petals less than 12 mm long; sepals less than 7 mm long (2)
    2. Petal lobes 3.5-5.0 mm long; fruits 12-27 mm long; pedicels about half as thick as the fruit. *E. chieranthoides*
    2. Petal lobes mostly 5-11 mm long; fruits (15) 25-100 mm long; pedicels as thick as the fruit. *E. repandum*

Halimolobos virgata

Hesperis matronalis

Isatis tinctoria

Lepidium

1. Plants 3-6 feet tall. *L. latifolium*
1. Plants less than 2 feet tall (2)
    2. Cauline leaves perfoliate-clasping, or auriculate. *L. perfoliatum*

2. Cauline leaves petiolate to sessile but not clasping, nor auriculate (3)
3. Styles 0.3-1.0 mm long; plants perennial (rarely biennial) *L. montanum* var. *montanum*
3. Styles less than 0.3 mm long; plants annual (4)
4. Stem single, but branched. *L. virginicum*
4. Stems several from a common root (5)
5. Fruits with a prominent notched wing. *L. dictyotum*
5. Fruits not winged. *L. procumbens*
syn. *Hutchinsinia procumbens*

Lesquerella (syn. *Physaria*)
1. Fruits compressed, sometimes only slightly so. *L. utahensis*
1. Fruits never compressed. *L. garrettii* = *L. multiceps*

Lunaria annua

Malcomia africana

Nasturtium officinale

Physaria chambersii var. chambersii

Rorippa
1. Pedicels usually as long as the fruit. *R. palustris*
1. Pedicels shorter than the fruit. *R. curvipes*

Schoencrambe linifolia

Sisymbrium
1. Fruits 50-90 mm long; petals 6.0-8.5 mm long. *S. altissimum*
1. Fruits 10-15 mm long; petals 2-4 mm long. *S. officinale*

Streptanthus cordatus

Thelypodiopsis sagittata var. sagittata

Thelypodium integrifolium var. *integrifolium*

Thlaspi
1. Plants annual; styles lacking, or to 0.2 mm long. *T. arvense*
1. Plants perennial; styles 0.3-2.5 mm long, or more. *T. montanum*

Cucurbitaceae

1. Plants annual; tendrils 3-forked; fruits spiny. *Echinocystis*
1. Plants perennial; tendrils unbranched; fruits smooth. *Bryonia*

Bryonia alba

Echinocystis lobata

Cuscutaceae

Cuscuta

1. Inflorescence a few-flowered umbellate-cyme; stems orange. *C. salina*
1. Inflorescence a many-flowered paniculate cyme; stems pale yellow (2)
   2. Sepals separate. *C. cuspidata*
   2. Sepals united. *C. indecora*

Dipsacaceae

Dipsacus sylvestris

Elaeagnaceae

Elaeagnus angustifolia

Euphorbiaceae

Euphorbia

1. Leaves symmetrical at base; flowers in a terminal inflorescence (2)
1. Leaves asymmetrical at base; flowers scattered along the stem (5)
   2. Leaf margins deeply dentate. *E. dentata*
   2. Leaf margins entire (3)
3. Leaves linear to narrowly oblong. *E. esula*
3. Leaves broadly elliptic to ovate (4)
   4. Leaves constricted into a short pointed tip. *E. myrsinites*
   4. Leaves not as above. *E. brachycera*
5. Stems, leaves, ovary and capsules glabrous. *E. glyptosperma* = *Chamaesyce glyptosperma*
5. Stems, leaves, ovary and capsules hairy (6)

6. Capsules with appressed hairs; styles divided less than half way to their base.
E. maculata = Chamaesyce maculata
6. Capsules with spreading hairs; styles divided almost to their base.
E. prostrata = Chamaesyce prostrata

Fagaceae

Quercus
1. Leaf lobes round. *Quercus gambelii* var. *gambelii*
1. Leaf lobes mostly acute.
A hybrid between *Q. gambelii and Q. turbinella*

Fumariaceae

1. Flowers solitary. *Dicentra*
1. Flowers numerous (2)
   2. Flowers purplish; flowers 5-10 mm long. *Fumaria*
   2. Flowers yellowish, or if white then with a purple-tip; flowers 17-25 mm long. *Corydalis*

Corydalis
1. Corolla white, often with a purplish tip; plants more than 50 cm tall. *C. caseana* var. *brachycarpa*
1. Corolla yellow; plants less than 10 cm tall.
C. aurea var. *aurea*

Dicentra uniflora

Fumaria officinalis

Gentianaceae

1. Corolla rotate, white to greenish-white. *Swertia*
1. Corolla tubular, bright pink to rose. *Centaurium*

Centaurium exaltatum

Swertia radiata

Geraniaceae

1. Leaves palmately lobed, or palmately divided. *Geranium*
1. Leaves pinnately dissected. *Erodium*

Erodium cicutarium

Geranium

1. Plants annual, or biennial; petals less than 1 cm long (2)
1. Plants perennial; petals more than 1 cm long (3)

    2. Sepals awned; anthers 10. *G. carolinianum*
    2. Sepals without awns; anthers 5. *G. pusillum*
3. Petals white, pilose 1/3-1/2 their length. *G. richardsonii*
3. Petals rose-purple, pilose 1/4 their length. *G. viscosissimum*

Guttiferae

Hypericum scouleri

Hydrophyllaceae

1. Flowers solitary (2)
1. Flowers in cymes, or ball-like clusters (3)
    2. Leaves simple; plants perennials. *Hesperochiron*
    2. Leaves pinnately divided; plants annuals. *Nemophila*
3. Stigma terminated by a minute ball; plants with tuberous roots. *Hydrophyllum*
3. Stigma not as above; plants with taproots. *Phacelia*

Hesperochiron pumilus

Hydrophyllum

1. Flower clusters on peduncles that are much longer than the leaves; leaf lobes 7-15. *H. occidentale*
1. Flower clusters on peduncles that are distincly shorter than the leaves; leaf lobes 5-7. *H. capitatum var. capitatum*

Nemophila

1. Leaves alternate. *N. breviflora*
1. Leaves opposite. *N. parviflora*

Phacelia

1. Plants annual. *P. linearis*
1. Plants perennial (2)
    2. Leaves entire, or some with two basal lobes. *P. heterophylla = P. hastata*
    2. Leaves divided into many pinnatifid lobes. *P. sericea*

1. Corolla only obscurely, or scarcely bilabiate (2)
1. Corolla strongly bilabiate (4)
    2. Stamens 2; plants odorless. *Lycopus*
    2. Stamens 4; plants aromatic (3)
3. Flowers borne in a terminal ball-like cluster. *Monardella*
3. Flowers borne in axillary whorls, or terminal elongated spikes. *Mentha*
    4. Flowers borne in clusters on the ends of stems (5)
    4. Flowers borne in the axils of cauline leaves (8)
5. Stamens conspicuously longer than the upper lip of the corolla. *Agastache*
5. Stamens shorter than the upper lip of the corolla (6)
    6. Calyx 15-nerved; upper stamens longer than the lower ones. *Nepeta*
    6. Calyx 5-10 nerved; lower stamens longer than the upper ones (7)
7. Calyx strongly irregular. *Prunella*
7. Calyx regular. *Stachys*
    8. Plants white-wooly. *Marrubium*
    8. Plants not white-wooly (9)
9. Leaves acerform. *Leonurus*
9. Leaves not acerform (10)
    10. Calyx almost regular. *Lamium*
    10. Calyx strongly irregular. *Scutellaria*

Agastache urticifolia

Lamium

1. Upper leaves sessile, or clasping. *L. amplexicaule*
1. Upper leaves with petioles. *L. purpureum*

Leonarus cardiaca

Lycopus

1. Leaves pinnatifid (at least the lower ones); plants without stolons. *L. americana*
1. Leaves serrate, or the lower ones rarely incised; plants with stolons. *L. asper*

Marrubium vulgare

Mentha

1. Flowers in axillary clusters. *M. arvensis*

1. Flowers in terminal spikes (sometimes with a few flowers in the upper axils). *M. spicata*

Monardella odoratissima ssp. *glauca*

Nepeta catarica

Prunella vulgaris

Scutellaria
1. Leaves entire, usually less than 3 cm long. *S. antirrhinoides*
1. Leaves crenate, mostly 3-9 cm long. *S. galericulata*

Stachys palustris var. *pilosa*

Leguminosae

1. Filaments separate. *Thermopsis*
1. Filaments united, either monadelphous, or diadelphous (2)
    2. Foliage glandular-dotted (3)
    2. Foliage not glandular-dotted (4)
3. Fruits spiny; leaves with many leaflets. *Glycyrrhiza*
3. Fruits not spiny; leaves with 3-5 leaflets. *Psoralidium*
    4. Leaves with tendrils (5)
    4. Leaves without tendrils (6)
5. Styles filiform with a ring of hairs circling their tip. *Vicia*
5. Styles flattened, pubescent, hairs not in a ring. *Lathyrus*
    6. Filaments monadelphous (7)
    6. Filaments diadelphous (8)
7. Herbs; flowers blue, purplish, or whitish. *Lupinus*
7. Shrubs; flowers yellow. *Cytisus*
    8. Leaflets toothed (rarely entire in *Trifolium*) (9)
    8. Leaflets entire (11)
9. Leaflets palmately trifoliate (rarely with more leaflets). *Trifolium*
9. Leaflets pinnately trifoliate (10)
    10. Inflorescence a short compact raceme; fruits curved to coiled. *Medicago*
    10. Inflorescence an elongated raceme; fruits not curved, not coiled. *Melilotus*
11. Plants trees, or shrubs (12)
11. Plants herbaceous perennials (13)
    12. Flowers yellow; shrubs. *Caragana*
    12. Flowers white, or pink; trees. *Robinia*

13. Flowers in umbellate clusters (14)
13. Flowers in racemes (15)
    14. Leaflets three. *Lotus*
    14. Leaflets more than 9. *Coronilla*
15. Wings mostly longer than the keel; fruit not constricted between the seeds. *Astragalus*
15. Wings shorter than the keel; fruit constricted between the seeds (16)
    16. Fruit (ovary) with spiny teeth. *Onobrychis*
    16. Fruit (ovary) without spiny teeth. *Hedysarum*

Astragalus

1. Leaflets awl-shaped, spinulose tipped. *A. kentrophyta var. tegatarius*
1. Leaflets oval, elliptic, or narrowly linear (2)
    2. Plants densely wooly-tomentose (3)
    2. Plants not tomentose (4)
3. Flowers pink-purple. *A. utahensis*
3. Flowers yellowish-white. *A. purshii var. purshii*
    4. Pubescence of malpighian hairs (5)
    4. Pubescence of simple hairs (6)
5. Fruits 1-2 cm long. *A. canadensis*
5. Fruits 3.5-5 cm long. *A. kelseyae*
    6. Leaflets long and linear, or narrowly linear-elliptic (7)
    6. Leaflets oval, elliptic, or almost round (8)
7. Tip of the keel elongated to form a dark-colored beak. *A. miser var. tenuifolius*
7. Tip of keel not forming a beak. *A. convallarius var. convallarius*
    8. Fruit brightly mottled, short-stipitate. *A. beckwithii var. beckwithii*
    8. Fruit not mottled, sessile (9)
9. Flowers pink-purple with a tinge of yellow; plants of sage, pinyon-juniper, or mountain brush habitats. *A. cibarius*
9. Flowers bright pink-purple; plants of meadows and stream banks. *A. argophyllus var. argophyllus*

Caragana arborescens

Coronilla varia

Cytisus scoparius

Glycyrrihza lepidota var. *lepidota*

Hedysarum boreale var. boreale

Lathyrus

1. Leaflets 2; stem strongly winged. *L. odoratus*
1. Leaflets 4, or more; stems angled, but not strongly winged (2)
    2. Keel much shorter than the corolla wings. *L. pauciflorus* var. *utahensis*
    2. Keel as long as the corolla wings (3)
3. Flowers 15-30 mm long; plants villous. *L. brachycalyx*
3. Flowers 8-15 mm long; plants not villous (4)
    4. Petals pink-purple. *L. lanzwertii* var. *lanzwertii*
    4. Petals white. *L. lanzwertii var. laetivirens*

Lotus

1. Flowers 3-4; leaflets acute. *L. tenuis*
1. Flowers 5-12; leaflets rounded. *L. corniculatus*

Lupinus

1. Leaflets glabrous on their upper surface (2)
1. Leaflets pubescent on their upper surface (3)
    2. Leaflets broad, oblanceolate, the largest often over 10 mm wide. *L. argenteus* var. *rubicaulis*
    2. Leaflets linear-oblanceolate, 4-6 mm wide, or less. *L. argenteus* var. *argenteus*
3. Dorsal surface of the banner glabrous. *L. caudatus*
3. Dorsal surface of the banner silky-pubescent. *L. sericeus* var. *sericeus*

Medicago

1. Flowers purplish, 7-11 mm long; plants erect perennials. *M. sativa*
1. Flowers yellow, 3-5 mm long; plants prostrate to decumbent annuals. *M. lupulina*

Melilotus

1. Flowers white. *M. albus*
1. Flowers yellow. *M. officinalis*

Onobrychis vicifolia

Psoralidium lanceolatum var. *lanceolatum*

Robinia pseudoacacia

Thermopsis montana

Trifolium

1. Plants annual. *T. varigatum*
1. Plants perennial (2)
    2. Calyx enclosing the corolla at maturity. *T. fragiferum*
    2. Calyx not enclosing the corolla (3)
3. Flower clusters sessile, or nearly so. *T. pratense*
3. Flower clusters borne on well-developed peduncles (4)
    4. Plants with stolons. *T. repens*
    4. Plants without stolons (5)
5. Flower cluster solitary, terminal. *T. longipes var. reflexum*
5. Flower clusters both terminal and axillary. *T. hybridum*

Vicia

1. Inflorescence glabrous, or short-pubescent, usually with fewer than 12 flowers. *V. americana* var. *americana*
1. Inflorescence long-villous, usually with 24, or more flowers. *V. villosa*

Lentibulariaceae

Utricularia vulgaris

Limnanthaceae

Floerkea proserpinacoides

Linaceae

Linum

1. Petals violet-blue, rarely white. *L. perenne*
1. Petals yellow, or orange. *L. kingii*

Loasaceae

Mentzelia

1. Petals 4-8 cm long; plants perennials. *M. laevicaulis* var. *laevicaulis*
1. Petals less than 8 mm long; plants annuals (2)

    2. Sepals 2-4 mm long; leaves pinnatifid. *M. albicaulis*
    2. Sepals 1-2 mm long; leaves entire. *M. dispersa*

Lythraceae

1. Petals 4; hypanthium as long as wide. *Ammania*

1. Petals 5-7; hypanthium longer than wide. *Lythrum*

Ammania robusta

Lythrum

1. Plants perennial: petals 4-12 mm long; stamens 10-14. *L. salicaria*
1. Plants annuals; petals 1.5–3 mm long; stamens 6, or fewer. *L. tribracteatum*

Malvaceae

1. Anthers scattered along the outside of a tube of united filaments. *Hibiscus*
1. Anthers forming a cluster at the top of a tube of united filaments (2)
   2. Stems prostrate, or sometimes merely decumbent (3)
   2. Stems definitely erect (4)
3. Petals stellate-pubescent; stigma minute, ball-shaped. *Malvella*
3. Petals glabrous; stigma along one side of the pistil. *Malva*
   4. Flowers reddish-orange. *Sphaeralcea*
   4. Flowers pink, or white (5)
5. Calyx with a whorl of 2-3 bracts at the base of the sepals; upper leaves acerform. *Iliamna*
5. Calyx without bracts; upper leaves palmately lobed with narrow segments. *Sidalcea*

Hibiscus trionum

Iliamna rivularis var. *diversa*

Malva neglecta

Malvella leprosa

Sidalcea

1 Sepals with stellate hairs. *S. oregana var. calva*
1. Sepals with coarse stiff hairs, but not stellate. *S. neomexicana*

Sphaeralcea

1. Inflorescence racemose, rarely with more than one flower per node. *S. coccinea*
1. Inflorescence a compact panicle with more than one flower per node. *S. munroana*

Moraceae

1. Leaves entire. *Maclura*
1. Leaves crenate-serrate and usually lobed. *Morus*

Maclura pomifera

Morus alba

Nyctaginaceae

1. Flowers cream-colored; herbage glandular-pubescent. *Abronia*
1. Flowers red-purple; herbage glabrous. *Mirabilis*

Abronia fragrans

Mirabilis

1. Leaves 10-20 times longer than wide. *M. linearis* var. *linearis*
1. Leaves less than 5 times longer than wide. *M. nyctaginea*

Oleaceae

Fraxinus velutina

Onagraceae

1. Flowers in a narrow elongated spike, or panicle, sometimes 30 cm long. *Gaura*
1. Flowers not as above (2)
    2. Sepals, petals and stamens 2. *Circaea*
    2. Sepals and petals 4; stamens usually 8 (3)
3. Seeds/ovules with a tuft of hair at one end (4)
3. Seeds/ovules without a tuft of hair (5)
    4. Flowers white, pink, or purplish, regular. *Epilobium*
    4. Flowers scarlet, strongly irregular. *Zauchneria*
5. Hypanthium not extending beyond the top of the ovary. *Gayophytum*
5. Hypanthium extending beyond the top of the ovary (6)
    6. Filaments attached to the middle of the anthers; petals white, or yellow, often pink, or red in older flowers (7)
    6. Filaments attached to the end of the anthers; petals pink to lavender, rarely whitish, but not yellow (8)

7. Stigmas hemispheric to subglobose, entire, or rarely 4-lobed. *Camissonia*
7. Stigmas deeply 4-cleft. *Oenothera*
    8. Sepals erect. *Boisduvalia*
    8. Sepals reflexed. *Clarkia*

Boisduvalia sensiflora

Camissonia boothi var. *villosa*

Circaea alpina var. *pacifica*

Clarkia rhomboidia

Epilobium.
1. Plants annuals with tap-roots. *E. brachycarpum*
1. Plants perennials lacking tap-roots (2)
    2. Stigma 4-lobed; petals about 1 cm long. *E. angustifolium*
    2. Stigma entire; petals less than 1 cm long (3)
3. Lower stem epidermis peeling off in sheets, or strips. *E. halleanum*
3. Lower stem epidermis not peeling (4)
    4. Stems 3-10 dm tall, freely branched above the middle; leaves serrulate to serrate. *E. ciliatum*
    4. Stems rarely more than 3 dm tall, simple, or sparingly branched near the base; leaves entire. *E. hornemannii*

Gaura parviflora

Gayophytum
1. Petals .5-1.5 mm long. *G. ramosissimum*
1. Petals 3-6 mm long. *G. diffusum*

Oenothera
1. Flowers yellow (2)
1. Flowers white when young, turning pinkish in older plants (3)
    2. Plants with well developed stems. *O. elata*

    2. Plants without well developed stems. *O. flava*
3. Plants without well developed stems, or nearly so (4)
3. Plants with well-developed stems (6)
    4. Hypanthium mostly 7-14 cm long; petals 3-6 cm long. *O. caespitosa* var. *marginata*
    4. Hypanthium 3-8 cm long; petals 2-4 cm long (5)

5. Plants glabrous, or nearly so, or with leaves puberulent only along their margins. *O. caespitosa* var. *caespitosa*
5. Plants villous throughout. *O. caespitosa* var. *crinita*
    6. Plants glabrous, or almost so with a few appressed hairs, sometimes glandular-pubescent above. *O. pallida ssp. pallida*
    6. Plants canescent to gray-strigillose, or villose, especially the upper parts of the plant. *O. pallida* ssp. *latifolia*

Zauchneria latifolia var. garrettii

Orobanchaceae

1. Corolla lobes finely ciliate. *Orobanche uniflora*
1. Corolla lobes not ciliate (2)
    2. Calyx lobes of same size and shape. *O. fasciculata*
    2. Calyx lobes of different size and shape. *O. corymbosum*

Oxalidaceae

Oxalis dillenii

Papaveraceae

1. Plants with spines; petals white. *Argemone*
1. Plants without spines; petals dark brownish-red. *Roemeria*

Argemone munita ssp. rotundata

Roemeria refracta

Plantaginaceae

Plantago

1. Leaves filiform, or linear. *P. elongata*
1. Leaves lanceolate, usually more than 1 cm wide (2)
    2. Leaves covered with long soft hairs. *P. patagonica*
    2. Leaves glabrous, or nearly so (3)
3. Leaves narrowly lanceolate. *P. lanceolata*
3. Leaves ovate. *P. major*

Polemoniaceae

1. Leaves entire (2)
1. Leaves pinnately, or palmately lobed (4)

2. Calyx lobes uniformly green. *Collomia*
2. Calyx lobes alternately green and white (3)
3. Plants annuals with single stems. *Microsteris*
3. Plants perennials with multiple stems. *Phlox*
4. Leaves pinnately lobed (5)
4. Leaves palmately lobed (7)
5. Plants annual. *Navarretia*
5. Plants perennial (6)
6. Corolla narrowly funnel-form with limbs spreading at right angles to the tube. *Gilia*
6. Corolla rotate-campanulate. *Polemonium*
7. Plants annual. *Linanthus*
7. Plants perennial. *Leptodactylon*

Collomia

1. Plants with branched stems. *C. tenella*
1. Plants with single, un-branched stems (2)
2. Corolla salmon-colored, 2-3 cm long. *C. grandiflora*
2. Corolla violet, 1 cm long. *C. linearis*

Gilia

1. Corolla largely, or wholly bright red with flaring tube. *G. aggregata* var. *aggregata*
1. Corolla whitish, or yellowish, often tinged with red, the tube scarcely flaring. *G. aggretata* var. *microsiphon*

Leptodactylon watsonii

Linanthus

1. Corolla barely longer than the calyx. *L. harkenessii*
1. Corolla 1.5-2 times longer than the calyx. *L. septentrionalis* (These two species may be synonyms)

Microsteris gracilis

Navarretia

1. Corolla yellow; plants glandular; stigmas typically 3. *N. breweri*

1. Corolla white, bluish, or lavender; plants villous, puberulent, or almost glabrous; stigmas typically 2. *N. intertexta*

Phlox

1. Plants in dense clusters, shoots erect. *P. longifolia*
1. Plants matted, caespitose. *P. hoodii*

Polemonium

1. Plants annual; corolla 2-6 mm long. *P. micranthum*
1. Plants perennial; corolla 8-15 mm long (2)
   2. Inflorescence a narrow, compact panicle; plants growing in wet meadows and along streams. *P. caeruleum*
   2. Inflorescence an open cyme; plants growing in mesic sites. *P. foliosissimum var. alpinum*

Polygonaceae

1. Leaves without stipules; flowers, or flower clusters subtended by whorls of partly united bracts. *Eriogonum*
1. Leaves with sheathing stipules; whorls of bracts beneath the flowers absent (2)
   2. Leaves kidney-shaped. *Oxyria*
   2. Leaves not kidney-shaped (3)
3. Perianth segments 5, all alike, erect. *Polygonum*
3. Perianth segments 6, the outer ones spreading, or reflexed, the inner ones usually erect. *Rumex*

Eriogonum

1. Plants annuals. *E. cernuum*
1. Plants perennials (2)
   2. Flowers with a stalk between the ovary and receptacle (3)
   2. Flowers without a stalk (called a stipe) (5)
3. Stems with a whorl of leaf-like bracts around the middle of the stem. *E. heracleoides*
3. Stems without a whorl of bracts around the stem (4)
   4. Flowers bright yellow. *E. umbellatum* var. *umbellatum*
   4. Flowers mostly whitish to cream, or pale yellow. *E. umbellatum* var. *majus*
5. Plants distinctly shrubby to subshrubby. *E. microthecum* var. *laxiflorum*
5. Plants herbaceous perennials (6)
   6. Flowers in elongated racemes. *E. racemosum*
   6. Flowers in umbellate, or ball-shaped clusters (7)
7. Leaf blades oval. *E. ovalifolium*
7. Leaf blades not oval, considerably longer than wide (8)
   8. Stems and branches pubescent. *E. brevicaule* var. *laxifolium*
   8. Stems and branches glabrous. *E. brevicaule* var. *brevicaule*

Oxyria diyyna

Polygonum

1. Plants twining vines. *P. convolvulus*
1. Plants not twining (2)
    2. Plants shrubs to 2 m high. *P. cuspidatum*
    2. Plants herbaceous, never shrubs (3)
3. Leaves jointed at the base (4)
3. Leaves not jointed at the base (6)
    4. Fruit reflexed. *P. douglasii*
    4. Fruit erect, or nearly so (5)
5. Stems decumbent, or prostrate. *P. aviculare*
5. Stems erect, or ascending. *P. ramosissimum*
    6. Plants of high elevations; leaves mostly basal from a woody caudex. *P. bistortoides*
    6. Plants of low and middle elevations; leaves mostly cauline; woody caudex absent (7)
7. Inflorescence usually 1, terminal; flowers bright pink. *P. amphibium*
7. Inflorescences several to many, axillary and terminal; flowers rose, white, or green (8)
    8. Leaf sheaths without bristles. *P. lapathifolium*
    8. Leaf sheaths with bristles (9)
9. Perianth glandular-punctate, pale green, or whitish. *P. punctata*
9. Perianth not glandular-punctate, pink to purple. *P. persicaria*

Rumex

1. Leaves mostly hastately lobed at base. *R. acetosella*
1. Leaves various but not hastately lobed (2)
    2. Flowers imperfect; plants dioecious. *R. paucifolius*
    2. Flowers perfect, or if imperfect then plants monoecious (3)
3. Wings of the fruit 10-20 mm wide. *R. venosus*
3. Wings of the fruit less than 10 mm wide (4)
    4. Wings of the fruit denticulate with spines. *R. maritimus* var. *fuegineus*
    4. Wings of the fruit entire, without spines (5)
5. Plants prostrate. *R. salicifolius*
5. Plants erect (6)
    6. Leaf margins crisped; leaves linear lanceolate, 1-5 cm wide. *R. crispus*
    6. Leaf margins not crisped; leaves broadly lanceolate, 6-15 cm wide. *R. patentia*

Portulacaceae

1. Flowers yellow. *Portulaca*
1. Flowers white, or pink (2)
    2. Flowers tightly congested into scorpioid umbels, or panicles. *Calyptridium*
    2. Flowers single to many in open racemes, or cymes (3)
3. Plants with corms, or thickened taproots (4)
3. Plants never with corms, or thickened roots. *Montia*
    4. Stems with one flower; petals 2-2.5 cm long. *Lewisia*
    4. Stems with several flowers; petals 7-12 mm long. *Claytonia*

Calyptridium umbellatum

Claytonia lanceolata

Lewisia

1. Sepals 4-9. *L. rediviva*
1. Sepals 2 (2)
    2. Plants arising from a corm; flowers solitary. *L. pygmaea*
    2. Plants arising from a taproot: flowers usually more than one on each peduncle. *L. triphylla*

Montia

1. Stem leaves alternate, linear. *M. linearis*
1. Stem leaves opposite, broad (2)
    2. Stems with 2-several pairs of leaves. *Montia chamissoi*
    2. Stems with a single pair of leaves (3)
3. Leaves connate-perfoliate; petals 2-7 mm long. *M. perfoliata*
3. Leaves not connate-perfoliate; petals 9-12 mm long. *M. cordifolia*

Portulaca oleracea

Primulaceae

1. Corolla absent; sepals petaloid, pink. *Glaux*
1. Corolla present (2)
    2. Corolla yellow. *Lysimachia*
    2. Corolla red, or white (3)
3. Flowers very small, usually less than 6 mm long, white. *Androsace*
3. Flowers large, showy, reddish-purple (4)

4. Corolla lobes distinctly reflexed. *Dodecatheon*
4. Corolla lobes not reflexed. *Primula*

Androsace
1. Sepal lobes broadly triangular, 3-nerved, flat. *A. filiformis*
1. Sepal lobes narrowly triangular to awl-shaped, not 3-nerved, but keeled, or involute (2)
    2. Involucral bracts ovate to elliptic. *A. occidentalis*
    2. Involucral bracts narrowly lanceolate to awl-shaped. *A. septentrionalis*

Dodecatheon
1. Petals and sepals 4. *D. alpinum*
1. Petals and sepals 5. D. *pulchellum* var. *pulchellum*

Glaux maritima

Lysimachia
1. Flowers solitary, or in pairs; leaves with petioles. *L. ciliata*
1. Flowers numerous in dense racemes; leaves sessile. *L. thrysifolia*

Primula parryi

Pyrolaceae

Pyrola
1. Flowers secund; petals greenish-white. *P. secunda*
1. Flowers not secund; petals pinkish to creme. *P. asarifolia*

Ranunculaceae

1. Plants climbing vines. *Clematis*
1. Plants not climbing vines (2)
    2. Leaves simple, filiform. *Myosurus*
    2. Leaves broad, entire, lobed, or crenate (3)
3. Corolla present (4)
3. Corolla absent; sepals petaloid (8)
    4. Flowers regular (5)
    4. Flowers irregular (6)
5. Pistil 1. *Actaea*
5. Pistils many. *Ranunculus*
    6. Flowers white, often with a tinge of blue, yellow, or scarlet; corolla with a long, narrow spur. *Aquilegia*

6. Flowers bluish-purple, or pale blue; calyx with an urn-shaped spur, or broad cap-like hood (7)
7. Calyx with a narrow urn-shaped spur. *Delphinium*
7. Calyx with a broad beaked hood on the top of the corolla. *Aconitum*
8. Leaves simple, entire, or crenate. *Caltha*
8. Leaves compound (9)
9. Leaves alternate. *Thalictrum*
9. Leaves whorled. *Anemone*

Aconitum columbianum var. *columbianum*

Actaea rubra ssp. *arguta*

Anemone multifida

Aquilegia
1. Sepals scarlet. *A. formosa*
1. Sepals white, or yellow (2)
2. Sepals white with little, or no tinge of blue. *A. caerulea*
2. Sepals yellow. *A. flavescens*

Caltha leptosepala

Clematis
1. Sepals white, or yellowish, 6-15 mm long; flowers paniculate. *C. ligusticifolia*
1. Sepals bluish, 20+ mm long; flowers solitary (2)
2. Leaves 2-3 times pinnately lobed, the lobes elliptic to linear. *C. hirsutissima*
2. Leaves bi- or tri-ternate, the lobes ovate. *C. columbiana* var. *columbiana*

Delphinium.
1. Leaf segments more than 1 cm wide; plants 6-10 dm tall. *D. occidentale* var. *occidentale*
1. Leaf segments less than 1 cm wide; plants usually less than 3 dm tall. *D. nuttallianum*

Myosurus
1. Beak of the achene 0.2-0.5 mm long. *M. minimus*
1. Beak of the achene 0.8-2 mm long. *M. apetalus*

Ranunculus

1. Plants floating in water; petals white (2)
1. Plants not floating in water; petals yellow, or red (3)
    2. Leaves of two kinds. *R. aquatilis* var. *aquatilis*
    2. Leaves all alike. *R. aquatilis* var. *diffusus*
3. Plants erect, in sage, mountain-brush, or disturbed habitats (4)
3. Plants erect, or procumbent, in marsh, or semi-aquatic habitats (7)
    4. Plants annual (5)
    4. Plants perennial (6)
5. Leaves all basal; plants usually less than 6 cm tall. *R. testiculatus*
5. Leaves both basal and cauline; plants more than 10 cm tall. *R. arvensis*
    6. Stems solid; roots tuberous; plants less than 7 cm tall. *R. jovis*
    6. Stems hollow; roots not tuberous; plants 1-3 dm tall. *R. inamoenus*
7. Leaves deeply lobed (8)
7. Leaves not deeply lobed, but entire, serrate, or crenate (11)
    8. Stems hollow (9)
    8. Stems not hollow (10)
9. Teeth on leaf lobes blunt; fruiting clusters twice as long as wide. *R. sceleratus* var. *multifidus*
9. Teeth on leaf lobes acute; fruiting clusters about as long as wide. *R. macounii*
    10. Stems prostrate and rooting at the nodes. *R. gmelinii* var. *hookeri*
    10. Stems erect, not rooting at the nodes. *R. repens*
11. Leaves reniform (kidney-shaped); stolons present. *R. cymbalaria* var. *saximontanus*
11. Leaves linear, or lanceolate; stolons absent. *R. alismaefolius* var. *montanus*

Thalictrum fendleri

Rhamnaceae

1. Petals 5; leaves palmately 3-veined; common on dry mountainsides. *Ceanothus*
1. Petals 4, rarely 5; leaves pinnately many veined; infrequent in moist soil along streams. *Rhamnus*

Ceanothus

1. Leaves serrulate throughout, persistent. *C. velutinus*

1. Leaves entire near their base, deciduous. *C. martini*

Rhamnus alnifolia

Rosaceae

1. Plants herbaceous (2)
1. Plants woody, decumbent, or upright shrubs, or trees (6)
   2. Petals lacking; flowers numerous, borne in dense spikes. *Sanguisorba*
   2. Petals present; flowers not as above (3)
3. Plants usually less than 10 cm tall; petals white. *Fragaria*
3. Plants taller than 10 cm; flowers yellow (4)
   4. Stamens 5. *Ivesia*
   4. Stamens more than 10 (5)
5. Style arising from the top of the ovary. *Geum*
5. Style arising from side, or base of ovary. *Potentilla*
   6. Leaves compound (7)
   6. Leaves simple (10)
7. Stems with prickles, or thorns (8)
7. Stems without prickles, or thorns (9)
   8. Flowers white. *Rubus*
   8. Flowers pink to red. *Rosa*
9. Leaflets entire; small shrubs, usually less than 1 m tall. *Potentilla*
9. Leaflets serrate; large shrubs, usually more than 2 m tall. *Sorbus*
   10. Plants caespitose, depressed undershrubs growing in rock crevices. *Petrophytum*
   10. Plants not caespitose, 3 dm, or more tall; habitat various, but not growing in rock crevices (11)
11. Leaves variously lobed (12)
11. Leaves not lobed, leaves toothed, entire, or revolute (17)
   12. Stems with thorns. *Crataegus*
   12. Stems without thorns (13)
13. Flowers bright yellow; leaves evergreen, usually less than 12 mm long. *Purshia*
13. Flowers white. or pinkish; leaves deciduous, usually longer than 12 mm (14)
   14. Flowers numerous in long panicles. *Holodiscus*
   14. Flowers solitary, or in few-flowered cymes (15)
15. Trees. *Crataegus*
15. Shrubs (16)
   16. Pistils 1-5. *Physocarpus*

16. Pistils numerous. *Rubus*

17. Stems with thorns, or spines. *Crataegus*

17. Stems without thorns, or spines (18)

18. Pistils 5 (19)

18. Pistil 1, or occasionally 2 (styles 1-5) (20)

19. Petals less than 2 mm long. *Holodiscus*

19. Petals 5-9 mm long. *Cowainia*

20. Ovary inferior (21)

20. Ovary superior (23)

21. Inflorescence a raceme. *Amelanchier*

21. Inflorescence a cyme, or umbel-like (22)

22. Infloresence umbel-like. *Malus*

22. Inflorescence a cyme. *Crataegus*

23. Flowers showy; petals present. *Prunus*

23. Flowers inconspicuous; petals lacking. *Cercocarpus*

Amelanchier

1. Leaves permanently lanate, at least on lower surfaces; petals 5-10 mm long; fruit often pubescent; styles mostly 2-4. *A. utahensis*

1. Leaves glabrate, or sparsely sericeous on lower surface; petals mostly 10-20 mm long; fruit glabrous; styles mostly 5. *A. alnifolia*

Cercocarpus

1. Leaves deciduous, flat, the margins dentate. *C. montanus*

1. Leaves evergreen, at least somewhat revolute, the margin entire, or dentate (2)

2. Leaves (at least some) with dentate margins. *C. montanus* x *C. ledifolius*

2. Leaves lacking teeth, usually strongly revolute (3)

3. Leaves elliptic, over 12 mm long; plants tall shrubs, or small trees. *C. ledifolius*

3. Leaves linear to narrowly oblong, usually less than 12 mm long, plants low, intricately branched shrubs. *C. intricatus*

Cowainia mexicana = *Purshia mexicana*

Crataegus douglasii var. *rivularis*

Fragaria vesca var. *bracteata*

Geum macrophyllum

Holodiscus

1. Leaves strongly villous-pubescent. *H. dumosus* var. *dumosus*
1. Leaves sparsely pubescent to glabrous. *H. dumosus* var. *glabrescens*

Ivesia

1. Petals white. *I. utahensis*
1. Petals yellow. *I. gordonii*

Malus sylvestris

Petrophytum caespitosum

Physocarpus

1. Twigs pubescent with stellate hairs, occasionally with glandular hairs; stamens distinctly unequal in length. *P. alternans*
1. Twigs glabrous, or with few stellate hairs, not glandular; stamens all about the same length. *P. malvaceus*

Potentilla

1. Plants woody. *P. fruticosa*
1. Plants herbaceous (2)
    2. Leaves palmately lobed (3)
    2. Leaves pinnately lobed (6)
3. Leaves with 3 leaflets (4)
3. Leaves with 5, or more leaflets (5)
    4. Sepals glandular. *P. biennis (may = P. norvegica)*
    4. Sepals not glandular. *P. norvegica*
5. Leaflets 5. *P. diversifolia*
5. Leaflets more than 5. *P. gracilis*
    6. Leaves densely pubescent on their upper surface; plants with long creeping stolons. *P. answerina*
    6. Leaves not densely pubescent; plants without stolons (7)
7. Leaflets dissected to their mid-rib; plants less than 2 dm tall. *P. ovina*
7. Leaflets dentate; plants more than 2 dm tall (8)
    8. Flowers white. *P. arguta*
    8. Flowers yellow. *P. glandulosa*

Prunus

1. Flowers numerous in elongated racemes. *P. virginiana*
1. Flowers few, borne singly, or in umbellate, or corymbose clusters. *P. americana*

Purshia tridentata

Rosa

1. Petals 1-2.5 cm long, generally in clusters of two, or more; sepals 1-2 cm long. *R. woodsii* var. *ultramontana*
1. Petals 2-4 cm long, usually solitary; sepals 1.5 cm long. *R. nutkana* var. *hispida*

Rubus

1. Leaves simple, palmately lobed; stems without prickles. *R. parviflorus*
1. Leaves compound; stems with prickles (2)
   2. Prickles straight; fruit red. *R. idaeus*
   2. Prickles curved like a cat's claw; fruit black. *R. leucodermis*

Sanguisorba minor

Sorbus scopulina

Rubiaceae

1. Flowers yellow, 5-merous. *Rubia*
1. Flowers white, 3-4 merous. *Galium*

Galium

1. Leaves 5-8 per whorl (2)
1. Leaves 2-4 per whorl (4)
   2. Ovary and fruit glabrous. *G. trifidum*
   2. Ovary and fruit hairy (3)
3. Plants annual; leaves 3-5 mm wide. *G. aparine*
3. Plants perennial; leaves 2-3 mm wide . *G. triflorum*
   4. Plants herbaceous without a woody base (5)
   4. Plants woody at their base (6)
5. Plants perennial; fruit glabrous. *G. trifidum*
5. Plants annual; fruit with hooked hairs. *G. bifolium*
   6. Mature fruits glabrous. *G. boreale*
   6. Mature fruits densely bristly. *G. multiflorum*

Rubia tinctoria

Salicaceae

1. Bud scales several. *Populus*
1. Bud scale 1. *Salix*

Populus

1. Leaves acerform, 3-5 lobed; undersurface of leaves white-tomentose. *P. alba*
1. Leaves not acerform; leaves not white tomentose (2)
   2. Petioles conspicuously flattened in cross section at least near the blade (3)
   2. Petioles not flattened in cross section, but round/oval (4)
3. Leaves with glandular teeth on their margins. *P. fremontii*
3. Leaves without glandular teeth (4)
   4. Mature bark white, smooth; plants seldom in riparian sites. *P. tremuloides*
   4. Mature bark gray with deep furrows; riparian plants (5)
5. Leaves lanceolate to ovate-lanceolate; petiole not over 1/3 the length of the blade. *P. angustifolia*
5. Leaves rhombic-lanceolate to rhombic-ovate, acuminate, crenate-serrate; petiole more than 1/3 the length of the blade.

   A hybrid between *P. fremontii* x *P. angustifolia*

Salix

1. Plants low shrubs growing in sub-alpine habitats. *S. wolfii*
1. Plants trees, shrubs, or if pseudo-shrubby, then with hundreds of separate upright stems; not growing in sub-alpine habitats (2)
   2. Mature leaves all with serrate, dentate, or crenate margins (3)
   2. Mature leaves not as above, some, or all with entire margins (5)
3. Plants weedy in fields and pastures; twigs white. *S. amygdaloides*
3. Plants in wild sites; twigs not white (4)
   4. Leaves with glandular-serrate margins; glands often present on the petiole near the blade. *S. lucida ssp. caudata*
   4. Leaves without glandular-serrate margins; glands absent on the petiole. *S. goodingii*
5. Plants pseudo-shrubs with hundreds of individual, straight upright stems. *S. exigua*
5. Plants shrubs, or sometimes small trees, but not as above (6)
   6. Leaves conspicuously glaucous on both upper and lower surface. *S. drummondiana*
   6. Leaves not as above (7)
7. Leaves green on both surfaces. *S. boothii*
7. Leaves glaucous beneath (8)
   8. Twigs strongly glaucous. *S. geyeriana*

8. Twigs not glaucous (9)
9. Leaf bases rounded to subcordate. *S. eriocephala*
9. Leaf bases cuneate, or acute (10)
10. Leaves oblanceolate. *S. scouleriana*
10. Leaves elliptic to oval. *S. bebbiana*

Santalaceae

Comandra umbellata

Saxifragaceae

1. Plants shrubs. *Ribes*
1. Plants herbs (2)
2. Stamens 10 (3)
2. Stamens 5 (4)
3. Petals deeply cleft; leaves deeply divided. *Lithophragma*
3. Petals entire; leaves dentate, or lobed, but not deeply divided. *Saxifraga*
4. Inflorescence a 1-sided raceme. *Mitella*
4. Inflorescence a panicle, never 1-sided. *Heuchera*

Heuchera
1. Sepals pink to reddish; stamens longer than sepals. *H. rubescens*
1. Sepals white; stamens shorter than the sepals. *H. parvifolia*

Lithophragma
1. Plants with bulblets in the inflorescence and in the axils of the upper leaves. *L. glabrum*
1. Plants without bulblets. *L. parviflora*

Mitella
1. Petals with 2-3 lobes; racemes secund. *M. stauropetala* var. *stauropetala*
1. Petals pinnately divided; racemes not secund, or only slightly secund. *M. pentandra*

Ribes
1. Stems prickly (2)
1. Stems not prickly (3)
2. Racemes with 3-15 flowers; ovaries and fruits with bristles and stipitate glands. *R. montigenum*
2. Racemes with 1-3 flowers; ovaries and fruits glabrous, or pubescent, but without bristles, or glands. *R. inerme*

3. Flowers yellow. *R. aureum*
3. Flowers white, pink, or greenish (4)
4. Leaves with yellowish crystalline glands. *R. hudsonianum*
4. Leaves without glands (5)
5. Flowers greenish-white to creme, 4-12 in each raceme; fruit black. *R. viscosissimum*
5. Flowers pink, 2-3 in each raceme; fruit reddish. *R. cereum*

Saxifraga

1. Inflorescence tightly conjested, globose, or cylindric; leaves elliptic to lanceolate, entire, or with shallow crenate margins. *S. rhomboidea*
1. Inflorescence open and many branched; leaves reniform to orbicular with deep crenate, or dentate margins. *S. odontoloma* (*S. nidifica* may represent an intermediate between these two species with its open inflorescence and entire to shallowly crenate leaf margins)

Scrophulariaceae

1. Corolla spurred. *Linaria*
1. Corolla not spurred (2)
2. Corolla nearly regular, rotate (3)
2. Corolla irregular, campanulate to tubular, (4-lobed in Synthris) (4)
3. Stamens 5; flowers yellow. *Verbascum*
3. Stamens 2; flowers blue, pink, or white. *Veronica*
4. Leaves mostly alternate (5)
4. Leaves mostly opposite, or basal (6)
5. Lower lip of the corolla as long as the upper lip; inflorescence consisting of yellow, or violet and white flowers. *Orthocarpus*
5. Lower lip of the corolla much shorter than the upper lip; inflorescence consisting of red, purplish, or scarlet leafy bracts. *Castilleja*
6. Anther-bearing stamens 2. *Synthris*
6. Anther-bearing stamens 4 (7)
7. Staminode conspicuous, filiform, spatulate, or scale-like (8)
7. Staminode absent, or inconspicuous (9)
8. Corolla pink, red, blue, or purplish, more than 1 cm long; staminode large, filiform, or spatulate. *Penstemon*
8. Corolla brownish, less than 1 cm long; staminode small, scale-like. *Scrophularia*
9. Flowers blue and white. *Collinsia*
9. Flowers yellow, or red. *Mimulus*

Castilleja

1. Plants annual, usually with only a single stem. *C. exilis*
1. Plants perennial, usually with several stems (2)
    2. Leaves with wavy margins. *C. applegatei*
    2. Leaves not wavy-margined (3)
3. Calyx the most brightly colored part of the inflorescence. *C. linariifolia*
3. Calyx not colorful; bracts brightly colored (4)
    4. Leaves mostly all entire, or occasionally with the upper ones slightly lobed (5)
    4. Leaves not entire, mostly with 1-3 linear, spreading lobes. *C. chromosa*
5. Bracts purplish to crimson; inflorescence branched. *C. rhexifolia*
5. Bracts scarlet to red-orange; inflorescence not branched. *C. miniata*

Collinsia parviflora

Linaria

1. Cauline leaves cordate-clasping, 10+ mm wide. *L. dalmatica*
1. Cauline leaves not cordate-clasping, less than 10 mm wide. *L. vulgaris*

Mimulus

1. Pedicels not longer than the calyx. *M. breweri*
1. Pedicels longer than the calyx (2)
    2. Corolla pink to dark-red, the tube yellow with red dots. *M. lewisii*
    2. Corolla yellow, sometimes with red, or maroon dots (3)
3. Sepals of unequal length, the upper longer than the others (4)
3. Sepals of same size and length (6)
    4. Corolla 1-2 cm long, the throat open. *M. glabratus* ssp. *utahensis*
    4. Corolla 2-4 cm long, the throat closed (5)
5. Flowers few, generally 1-5; plants of high elevations. *M. tilingii* var. *tilingii* (may = *M.guttatus)*
5. Flowers usually more than 5; plants of low to middle elevations. *M. guttatus* var. *guttatus*
    6. Calyx glandular-pubescent, reddish; corolla 4-6 mm long. *M. suksdorfii*
    6. Calyx not glandular, not reddish; corolla 14-24 mm long. *M. moschatus*

Orthocarpus

1. Corolla purple and white; leaves mostly 3-cleft. *O. purpureoalbus*
1. Corolla yellow; leaves usually entire (2)
   2. Upper lip of the corolla produced into a small forward projecting beak at the apex. *O. tolmei*
   2. Upper lip of the corolla not beaked. *O. luteus*

Penstemon

1. Flowers bright scarlet-red. *P. eatonii*
1. Flowers not scarlet-red (2)
   2. Flowers pinkish-white with dark maroon guide-lines. *P. palmeri* ssp. *palmeri*
   2. Flowers blue to purple, sometimes yellowish-brown (3)
3. Anthers dehiscent only across their point of contact (4)
3. Anthers dehiscent throughout their entire length, or nearly so (6)
   4. Calyx broadly ovate, usually less than 3 mm long. *P. sepalulus*
   4. Calyx lanceolate, usually longer than 3 mm (5)
5. Corolla less than 2 cm long: plants growing at elevations above 7000'. *P. leonardii*
5. Corolla 2.5 cm, long, or more; plants growing at elevations below 7000'. *P. platyphyllus*
   6. Inflorescence distinctly and definately secund. *P. subglaber*
   6. Inflorescence not secund (7)
7. Anthers with numerous long tangled hairs that are 3-4 times longer than the width of the anther sac. *P. montanus*
7. Anthers glabrous, or with few short hairs (8)
   8. Calyx glandular-pubescent (9)
   8. Calyx glabrous (11)
9. Corolla 8-18 mm long, lower lip not projecting forward. *P. humilus*
9. Corolla 17-30 mm long, lower lip projecting forward (10)
   10. Staminode exerted; leaves both cauline and basal. *P. whippleanus*
   10. Staminode included; leaves all cauline. *P. radicosus*
11. Leaves strongly glaucous; anthers glabrous. *P. pachyphyllus*
11. Leaves not glaucous; anthers pubescent. *P. cyananthus*

Scrophularia lanceolata

Synthris pinnatifida var. *pinnatifida*

Verbascum

1. Plants wooly-pubescent; leaves entire. *V. thapsis*
1. Plants not wooly-pubescent; leaves dentate. *V. blattaria*

Veronica

1. Plants perennials (2)
1. Plants annuals (5)
    2. Racemes axillary (3)
    2. Racemes terminal (4)
3. Leaves short-petioled. *V. americana*
3. Leaves sessile, cordate clasping. *V. anagallis-aquatica*
    4. Stem erect; raceme short and dense. *V. wormskjoldii*
    4. Stem decumbent, or creeping; raceme elongated. *V. serpyllifolia*
5. Peduncles as long, or longer than the leaves. *V. persica*
5. Peduncles shorter than the leaves (6)
    6. Leaves palmately lobed. *V. hederifolia*
    6. Leaves not palmately lobed (7)
7. Flowers white, or pale lilac; cauline leaves linear-oblong. *V. peregrina*
7. Flowers dark blue; cauline leaves ovate-crenate. *V. arvensis*

Solanaceae

1. Corolla at least 6 cm long; fruit spiny. *Datura*
1. Corolla much smaller than 6 cm; fruit not spiny (2)
    2. Stamens joined together around the style. *Solanum*
    2. Stamens not joined together (3)
3. Inflorescence strongly one-sided. *Hyoscyamus*
3. Inflorescence not one-sided (4)
    4. Corolla funnel-form, white, or greenish-white. *Nicotiana*
    4. Corolla campanulate, yellow with reddish-purple blotches at the base. *Physalis*

Datura stramonium

Hyoscyamus niger

Nicotiana attenuta

Physalis longifolia

Solanum

1. Plants spiny; leaves with stellate pubescence. *S. rostratum*
1. Plants not spiny; pubescence never stellate (2)
   2. Plants vine-like, somewhat woody below; flowers bright violet to blue-purple; fruit red. *S. dulcamara*
   2. Plants not vine-like, not woody; flowers white to faintly bluish; fruit yellow, or black. (3)
3. Stems and leaves sticky-glutinous; fruit yellow. *S. sarrachoides*
3. Stems and leaves not sticky-glutinous; fruit black. *S. nigrum*

Tamaricaceae

Tamarix chinensis

Ulmaceae

1. Leaves mostly palmately 3-veined; fruit a drupe. *Celtis*
1. Leaves strongly pinnately veined; fruit a samara. *Ulmus*

Celtis reticulata

Ulmus

1. Leaves mostly singly serrate, each half of the base of the leaf the same size and shape. *U. pumila*
1. Leaves doubly serrate, each half of the base of the leaf of different size and shape. *U. procera*

Umbelliferae

1. Plants low-growing, 2-5 cm tall; root a spherical corm about 2-3 cm in diameter. *Orogenia*
1. Plants much taller; roots not as above (2)
   2. Fruit 10+ times longer than wide, not winged. *Osmorhiza*
   2. Fruit ovate to narrowly oblong, with narrow, or wide wings (3)
3. Fruit flattened parallel to the septum, either strongly so, or only slightly so (4)
3. Fruit flattened only slightly at right angles to the septum (9)
   4. Ovary and fruit with long stout spines. *Daucus*
   4. Ovary and fruit lacking spines (5)
5. Leaflets ovate, or acerform and 1-4 dm long and wide (6)
5. Leaflets not ovate, not acerform (7)
   6. Leaflets ovate, serrate on the distil margin. *Smyrnium*
   6. Leaflets broadly acerform 1-4 dm long and wide. *Heracleum*

7. Leaflets well defined, broad, never linear, serrate. *Angelica*
7. Leaflets never well defined, or few and narrowly linear (8)
    8. Fruits with wide wings extending out from lines along the entire surface of the fruit. *Cymopterus*
    8. Fruits with narrow wings attached only along the margin of the fruit. *Lomatium*
9. Lower stems with numerous reddish-purplish spots/blotches; plants 5-7 feet tall. *Conium* **(poisonous)**
9. Lower stems not as above; plants much smaller (10)
    10. Veins in leaves terminating in the notch between the leaf serrations. *Sium*
    10. Veins in leaves not as above (11)
11. Leaflets lanceolate, uniformly serrate. *Cicuta*
11. Leaflets not as above (12)
    12. Leaves divided into few long and narrow segments about .5 mm wide and 15 cm, or more long. *Perideridia*
    12. Leaves divided into broad, pinnately lobed segments (13)
13. Leaves once-pinnate; wet places, or shallow water. *Berula*
13. Leaves 2-3 times pinnate; frequent with aspen. *Ligusticum*

Angelica

1. Ovary and fruit scabrous, or hairy; plants 1-2 m tall. *A. wheeleri*
1. Ovary and fruit glabrous; plants smaller. *A. pinnata*

Berula erecta

Cicuta maculata var. *angustifolia* **(violently poisonous if eaten)**

Conium maculatum **(violently poisonous if eaten)**

Cymopterus

1. Lobes of the bracts beneath the inflorescence forked. *C. hendersonii*
1. Lobes of the bracts beneath the inflorescence entire (2)
    2. Lobes of the bracts beneath the umbels united, broad. *C. purpurescens*
    2. Lobes of the bracts beneath the umbels separate, narrow (3)
3. Anthers white, or yellow. *C. longipes var. longipes*
3. Anthers dark purple. *C. ibapensis (may = C. longipes)*

Daucus carota

Heracleum lanatum

Ligusticum

1. Smallest leaf segments linear, less than 1 mm wide. *L. filicinum*
1. Smallest leaf segments ovate, 3-8 mm wide. *L. porteri*

Lomatium

1. Smallest leaf segments filiform, or pinnately lobed (2)
1. Smallest leaf segments spatulate to linear, not lobed (5)
    2. Smallest leaf lobes filiform (3)
    2. Smallest leaf lobes pinnately lobed (4)
3. Stems few; fruit 2-4 mm wide, the wings less than .5 mm wide. *L. bicolor*
3. Stems numerous; fruit 5-8 mm wide, the wings 1.5-2 mm wide. *L. grayi var. grayi*
    4. Stems several; leaves both cauline and basal. *L. dissectum*
    4. Stems few; leaves all basal. *L. juniperinum*
5. Roots very slender, often with a globose section. *L ambiguum*
5. Roots thickened taproots, never globose (6)
    6. Plants with several stems arising from a woody caudex with numerous clusters of old persistent leaf bases. *L. graveolens var. graveolens*
    6. Plants with usually only one stem arising from a simple unbranched caudex. *L. triternatum*

Orogenia linearifolia

Osmorhiza

1. Flowers yellow; fruit glabrous. *O. occidentalis*
1. Flowers greenish-white; fruit with numerous bristles. *O. chilensis*

Perideridia bolanderi

Sium suave

Smyrnium nudicaule = *Lomatium nudicaule*

Urticaceae

Urtica dioica var. *occidentalis*

Valerianaceae

1. Plants perennial; corolla regular; calyx present, consisting of a reduced ring when in flower and feathery bristles when in fruit. *Valeriana*
1. Plants annual; corolla irregular; calyx absent. *Plectritis*

Plectritis macrocera

Valeriana

1. Plants from taproots. *V.* edulis
1. Plants from rhizomes (2)
    2. Corolla 2-3.5 mm long, almost rotate. *V. occidentalis*
    2. Corolla 4-7 mm long, funnelform. *V. acutiloba*

Verbenaceae

Verbena

1. Stems erect, up to 1 m tall. *V. hastata*
1. Stems prostrate, or low spreading, usually less than 2 dm tall. *V. bracteata*

Violaceae

Viola

1. Flowers yellow (2)
1. Flowers not yellow (3)
    2. Leaf blades mostly less than 25 mm long with purple veins. *V. purpurea var. venosa*
    2. Leaf blades mostly longer than 25 mm; veins not purple. *V. nuttallii var. praemorsa*
3. Leaves deeply divided into linear, or spatulate divisions; lower petals white with yellowish bases, upper petals reddish-purple. *V. beckwithii*
3. Leaves crenate, dentate, but not divided; flowers not as above (4)
    4. Plants acaulescent (5)
    4. Plants short caulescent (stems only 1-2 cm long) (7)
5. Plants without stolons. *V. nephrophylla*
5. Plants with stolons (6)
    6. Petals dark purple (rarely white); lawns and ditchbanks. *V. odorata*
    6. Petals white to pale violet (high elevations in meadows, aspen and tundra). *V. palustris*

7. Petal spurs 3.5-7 mm long; petals blue, violet or white. *V. adunca*

7. Petal spur 0.5-1.3 mm long, flowers white. *V. canadensis*

(The yellow flowered violets in our area have been divided into as many as five different species. In this field guide, I follow Stan Welsh in recognizing only two species. *Viola* is a difficult genus to describe as many of the taxa hybridize freely forming fertile intermediates. Trying to separate taxa on the basis of leaf shape is usually pointless. *V. beckwithii* has the most distinctive leaves in our flora)

Viscaceae

1. Plants parasitic on *Abies* and *Picea*. *Arceuthobium*
1. Plants parasitic on *Juniperus*. *Phoradendron*

Arceuthobium douglasii

Phoradendron juniperinum

Vitaceae

Parthenocissus quinquifolia

Zygophyllaceae

Tribulus terestris

CLASS *Monocotyledoneae*

1. Sepals and petals present, sepals may resemble petals (2)
1. Sepals and petals absent (6)
   2. Flowers strongly irregular. *Orchidaceae*
   2. Flowers regular (3)
3. Plants with woody bases; leaves stiff and sword-like. *Agavaceae*
3. Plants not as above (4)
   4. Pistils several-many. *Alismaceae*
   4. Pistil 1 (5)
5. Stamens 6; ovary superior. *Liliaceae*
5. Stamens 3; ovary inferior. *Iridaceae*
   6. Plants free-floating aquatics without true stems; plants less than 1 cm wide. *Lemnaceae*
   6. Plants not free-floating, terrestrial, or aquatic; true stems present; plants much larger (7)

7. Flowers sessile in the axils of chaffy, or husk-like scales (8)
7. Flowers not in the axils of chaffy bracts, may be sessile, or pedicellate (9)
    8. Leaf sheaths split lengthwise on side opposite blade; leaves 2-ranked; stems mostly hollow; anthers versatile; flowers subtended by 2 bracts. *Gramineae*
    8. Leaf sheaths not split; leaves 3-ranked; stems mostly not hollow; anthers basifixed; flowers subtended by 1 bract. *Cyperaceae*
9. Plants floating, or submerged (10)
9. Plants terrestrial, or in shallow water with both leaves and flowers emergent (12)
    10. Flowers borne in axillary cymes, or solitary in the axils. *Zannichelliaceae*
    10. Flowers borne in spikes, or heads (11)
11. Spikes axillary; stamens 4. *Potamogetonaceae*
11. Spikes terminal; stamens 2. *Ruppiaceae*
    12. Inflorescence of subglobose heads, or racemes, but not in dense spikes (13)
    12. Inflorescence a dense elongated spike, or with staminate and pistillate flowers in separate elongated spikes (14)
13. Flowers perfect. *Juncaceae*
13. Flowers imperfect and separated into separate globose heads. *Sparganiaceae*
    14. Inflorescence a double spike with the staminate flowers above the pistillate ones. *Typhaceae*
    14. Inflorescence a single spike with the staminate and pistillate flowers intermingled, or flowers perfect. *Juncaginaceae*

Agavaceae

Yucca baccata

Alismaceae

1. Leaves sagittate. *Sagittaria*
1. Leaves elliptic-ovate. *Alisma*

Alisma

1. Leaves narrowly elliptic to linear. *A. gramineum*
1. Leaves broadly elliptic to ovate. *Alisma plantago-aquatica*

Sagittaria cuneata

Cyperaceae

1. Ovary enclosed in a perigynium. *Carex*
1. Ovary not enclosed within a perigynium (2)
    2. Stems with one spike. *Eleocharis*
    2. Stems with 2, or more spikes (3)
3. Scales of the spikelets spirally arranged. *Scirpus*
3. Scales of the spikelets 2-ranked, in vertical rows. *Cyperus*

Carex

1. Flowers appearing to form a single cluster terminating the stem (2)
1. Flowers not forming a single cluster, but rather separated into distinct and widely separated lateral and terminal spikes (9)
    2. Inflorescence with a long bract below the lowest spike, the bract often twice as long as the inflorescence. *C. athrostachya*
    2. Inflorescence without a long bract, the bracts usually not longer than a single spike (3)
3. Stems arising from long creeping rhizomes (4)
3. Stems without rhizomes, or with very short rhizomes (5)
    4. Perigynium prominently few nerved, pale brownish. *C. douglasii*
    4. Perigynium inconspicuously many-nerved, dark brown with greenish margins. *C. praegracilis*
5. Perigynium broadest at its base. *C. stipata*
5. Perigynium broadest at the middle, or just slightly below middle (6)
    6. Leaves all borne on the lower portion of the stems (7)
    6. Leaves arising from both lower and middle portions of the stem (8)
7. Perigynium ovate, nerveless; leaves 0.5-2 mm wide. *C. vallicola*
7. Perigynium lanceolate, obscurely nerved; leaves 2-4 mm wide. *C. ebenea*
    8. Perigynium with a brown-tipped beak. *C. microptera*
    8. Perigynium without a beak. *C. hoodii*
9. Stigmas 2 (10)
9. Stigmas 3 (13)
    10. Pistillate scales pale green. *C. aurea*
    10. Pistillate scales black, or blackish (11)
11. Staminate and pistillate flowers in the same spike. *C. illota* (Grades into and perhaps = *C. interior and C. echinatus*
11. Staminate and pistillate flowers in separate spikes (12)

12. Perigynium nerved, narrowly ovate, with prominent v-shaped notch on its distil end. *C. nebraskensis*
12. Perigynium without nerves, broadly ovate; without v-shaped notch on its distil end. *C. aquatilis*

13. Perigynium glabrous. *C. rostrata*
13. Perigynium densely pubescent (14)
    14. Plants with rhizomes; spikes 3-5 cm long. *C. lanuginosa*
    14. Plants without rhizomes; spikes 1-1.5 cm long. *C. rossii*

Cyperus

1. Plants perennial; rhizomes present. *C. esculentus*
1. Plants annual; rhizomes lacking.
    2. Stigmas 2. *C. bipartitus*
    2. Stigmas 3. *C. squarrosus*

Eleocharis

1. Stigmas 2. *E. palustris*
1. Stigmas 3 (2)
    2. Base of the style constricted to form a cap on the top of the achene (3)
    2. Base of the style not constricted, no cap present (4)
3. Achenes white, or gray. *E. acicularis*
3. Achenes yellow, brown, or black. *E. parishii*
    4. Stems with 1 green sheath. *E. parvula*
    4. Stems with 2 reddish, or purple sheaths. *E. rostellata*

Scirpus

1. Stems round, or oval in cross section (2)
1. Stems triangular in cross section (3)
    2. Spikelets pale yellow-brown, elongate. *S. acutus*
    2. Spikelets chestnut, broad. *S. validus*
3. Leaves reduced, not projecting out from the stem (4)
3. Leaves well formed and elongated, well separated from the stem (5)
    4. Bract below the inflorescence 3-5 cm long; plants usually less than 1 m tall. *S. americanus*
    4. Bract below the inflorescence usually less than 2 cm long; plants 1.0-1.5 m tall. *S. olneyi*
5. Inflorescence with numerous branches and with many smaller spikelets; high mountain streams. *S. microcarpus*
5. Inflorescence not as above; saline marshes in low valleys. *S. maritimus* *may = S. fluviatilis*

1. Spikelets bearing 1- many florets; staminate, neuter, or rudimentary florets, if present, above the perfect florets (except in *Phalaris*); spikelets usually laterally flattened; articulation usually above the glumes. SUBFAMILY: *Festucoideae* p. 77
1. Spikelets bearing only 1 perfect floret, or some with a staminate, neuter, or rudimentary floret below the perfect one; spikelets usually dorsally flattened; articulation below the glumes. SUBFAMILY: *Panicoideae* p. 84

SUBFAMILY *Festucoideae*

1. Spikelets with 2 sterile lemmas below the fertile floret. *Phalaris*
1. Spikelets without sterile lemmas below the perfect floret (2)
   2. Glumes absent; leaf margins with very sharp glass-like serrations. *Leersia*
   2. Glumes present; leaf margins not as above (3)
3. Spikelets pedicellate in open, or contracted panicles (4)
3. Spikelets sessile, or subsessile (6)
   4. Spikelets 1-flowered. *Key 4*
   4. Spikelets 2- to many-flowered (5)
5. Glumes shorter than the first floret; lemmas awnless, or awned from the tip. *Key 1*
5. Glumes as long as the first floret, or longer; lemmas awnless, or awned from their back. *Key 3*
   6. Spikelets on opposite sides of a continuous, or jointed rachis. *Key 2*
   6. Spikelets on one side of a continuous rachis. *Key 5*

Key 1. Spikelets pedicellate in open, or contracted panicles, 2- to many-flowered; glumes shorter than the first floret; lemmas awnless, or awned from the tip.

1. Plants often 2 m, or more tall; panicle 2 dm, or more long, plume-like. *Phragmites*
1. Plants rarely more than 1.5 m tall; inflorescence various (2)
   2. Lemmas 1-3 nerved (3)
   2. Lemmas 5- to many-nerved (5)
3. Lemmas truncate; aquatic plants. *Catabrosa*
3. Lemmas acute; plants not aquatic (4)
   4. Lemmas awned. *Leptochloa*
   4. Lemmas without awns. *Eragrostis*
5. Lemmas keeled on back (rounded in some *Poa*) (6)

5. Lemmas rounded on back (10)
    6. Spikelets crowded in 1-sided clusters. *Dactylis*
    6. Spikelets not crowded in 1-sided clusters (7)
7. Lemmas awned from a bifid apex. *Bromus*
7. Lemmas awnless (8)
    8. Plants dioecious (9)
    8. Plants not dioecious. *Poa*
9. Plants growing in low elevation alkaline soils. *Distichlis*
9. Plants growing on dry mountain slopes. *Leucopoa*
    10. Spikelets in a 1-sided spike-like raceme. *Sclerochloa*
    10. Spikelets not 1-sided, in an open, or contracted panicle (11)
11. Inflorescence reduced to a single spikelet. *Danthonia*
11. Inflorescence not as above (12)
    12. Glumes papery; spikelets purplish at tip. *Melica*
    12. Glumes not papery; spikelets not purplish (13)
13. Nerves of lemma converging towards the apex (14)
13. Nerves of the lemma not converging towards the apex (17)
    14. Lemmas awned from a bifid apex. *Bromus*
    14. Lemmas not as above, entire, pointed, awnless, or awned from the tip (15)
15. Spikelets without awns. *Poa*
15. Spikelets with awns (16)
    16. Lemmas pilose on the margins; ligule a ring of hairs. *Danthonia*
    16. Lemmas not pilose; ligules membranous. *Festuca*
17. Nerves prominent; fresh water plants. *Glyceria*
17. Nerves not prominent; plants of saline areas. *Puccinellia*

Key 2. Spikelets sessile, or subsessile, on opposite sides of a continuous, or jointed rachis.

1. Spikelets solitary at each node of the rachis (occasionally 2 in *Agropyron*) (2)
1. Spikelets more than 1 at each node of the rachis (occasionally 1 in *Elymus*) (6)
    2. Spikelets placed edgewise to the rachis. *Lolium*
    2. Spikelets placed flatwise to the rachis (3)
3. Plants perennial. *Agropyron*
3. Plants annual (4)
    4. Spikelets cylindric. *Aegilops*
    4. Spikelets compressed (5)
5. Glumes ovate, 3-nerved. *Triticum*

5. Glumes awl-shaped, 1-nerved. *Secale*
    6. Spikelets 3 at each node. *Hordeum*
    6. Spikelets 2 at each node. *Elymus*

Key 3. Spikelets pedicellate in open, or contracted panicles, 2- to many-flowered; glumes as long as the first floret, or longer; lemmas awnless, or awned from their back.

1. Lemmas awnless. *Koeleria*
1. Lemmas awned (2)
    2. Florets 2, one perfect and one staminate. *Arrhenatherum*
    2. Florets 2, or more, all perfect (3)
3. Spikelets at least 1 cm long. *Avena*
3. Spikelets less than 1 cm long (4)
    4. Awn attached above the middle of the lemma. *Trisetum*
    4. Awn attached below the middle of the lemma. *Deschampsia*

Key 4. Spikelets pedicellate in open, or contracted panicles, 1-flowered.

1. Lemma hard, terete, awned, the nerves obscure (2)
1. Lemma thin, or firm, if thin then the nerves prominent (4)
    2. Awn branched into 3 segments. *Aristida*
    2. Awn not branched (3)
3. Awn persistent, twisted. *Stipa*
3. Awn deciduous, not twisted. *Oryzopsis*
    4. Articulation below the glumes, the spikelets falling entire (5)
    4. Articulation above the glumes (6)
5. Glumes with long soft awns. *Polypogon*
5. Glumes awnless (6)
    6. Lemmas awned. *Alopercurus*
    6. Lemmas without awns. *Crypsis*
7. Glumes as long, or longer than the lemma (8)
7. Glumes shorter than the lemma (9)
    8. Panicle dense, spike-like, cylindric. *Phleum*
    8. Panicle open, or contracted, but not as above. *Agrostis*
9. Lemma 3-nerved, awned from the tip. *Muhlenbergia*
9. Lemma 1-nerved, awnless. *Sporobolis*

Key 5. Spikelets sessile, or subsessile, on one side of a continuous rachis.

1. Inflorescence palmately branched; spikelets falling entire; glumes unequal in length. *Cynodon*
1. Inflorescence a dense elongated panicle; spikelets not falling entire; glumes equal in length. *Beckmannia*

Aegilops cylindrica

Agropyron cristatum

Agrostis
1. Palea absent; rhizomes and stolons absent. *A. scabra*
1. Palea present; rhizomes and stolons present. *A. stolonifera*

Alopecurus
1. Awns of the lemmas extending no more then 2 mm beyond the glumes. *A. carolineannus*
1. Awns of the lemmas hidden from view by the glumes, or barely extending beyond them. *A. aequalis*

Aristida purpurea

Arrenatherum elatius

Avena fatua

Beckmannia syzigachne

Bromus
1. Plants perennial (2)
1. Plants annual (5)
    2. Spikelets strongly flattened; lemmas usually keeled. *B. carinatus*
    2. Spikelets not strongly flattened, terete; lemmas always rounded on back (3)
3. Rhizomes present; lemmas usually awnless, or with awns less than 2 mm long; panicles mostly erect. *B. inermis*
3. Rhizomes lacking; lemmas with awns more than 2 mm long; panicles mostly nodding (4)
    4. Lemmas with hairs concentrated on the margins with only a few hairs on the back, or base; first glume usually 1-nerved. *B. ciliatus*

4. Lemmas with hairs on the margins and across the back; first glume usually 3-nerved. *B. anomalus*

5. Lemmas less than 10 (12) mm long, 1.5-4.0 mm wide (6)
5. Lemmas 10-30 mm long, 0.5-1.5 mm wide (8)
   6. Lemmas narrow, 1.2-2.5 mm wide, with long awns; florets not spreading (7)
   6. Lemmas broad 2.8-4.0 mm wide, awnless, or nearly so; florets widely spreading. *B. brizaeformis*
7. Panicles open; pedicels longer than the spikelets. *B. japonicus*
7. Panicles compact; pedicels shorter than the spikelets. *B. hordeaceus*
   8. Awns 30-60 mm long; lemmas 13-30 mm long. *B. diantrus*
   8. Awns 10-20 mm long; lemmas 10-15 mm long. *B. tectorum*

Catabrosa aquatica

Crypsis

1. Panicles 5x longer than wide. *C. alopecuroides*
1. Panicles less than 5x longer than wide. *C. schoenoides*

Cynodon dactylon

Dactylis glomerata

Danthonia

1. Inflorescence consisting of a single spikelet. *D. unispicata*
1. Inflorescence consisting of many spikelets. *D. californica*

Deschampsia

1. First glume shorter than the upper floret; anthers 1.2-3 mm long. *D. cespitosa*
1. First glume as long, or longer than the upper floret; anthers 0.2-0.7 mm long (2)
   2. Awn straight. *D. elongata*
   2. Awn abruptly bent. *D. danthonioides*

Distichlis spicata

Eragrostis

1. Plants creeping, rooting at the nodes, mat-forming. *E. hypnoides*
1. Plants erect although sometimes decumbent at the base, not mat-forming. *E. cilianensis*

Elymus

1. Awns bent at right angles to the spikelet. *E. spicatus*
1. Awns not bent (2)
    2. Awns 2-8 cm long. *E. elymoides* = *Sitanion hystrix*
    2. Awns less than 2 cm long (3)
3. Spikelets densely pubescent. *E. lanceolatus*
3. Spikelets glabrous (4)
    4. Plants with long rhizomes (5)
    4. Plants without rhizomes, or with only very short rhizomes (7)
5. Awns 10-15 mm long. *E. repens*
5. Awns less than 5 mm long (6)
    6. Glumes with 3-7 prominent nerves. *E. smithii*
    6. Glumes only obscurely 1-3 nerved, or without nerves. *E. triticoides*
7. Spikelets solitary at each node. *E. trachycaulus*
7. Spikelets 2-6 at each node (8)
    8. Glumes with 3-7 prominent nerves. *E. glaucus*
    8. Glumes with 1-3 obscure nerves. *E. cinereus*

Festuca

1. Plants annual. *F. octoflora*
1. Plants perennial (2)
    2. Blades involute, stiff, less than 3 mm wide. *F. ovina*
    2. Blades flat, lax, soft, more than 3 mm wide (3)
3. Plants with short rhizomes: awns 3-4 mm long. *F. pratensis* = *F. arundinacea*
3. Plants without rhizomes; awns 5-17 mm long. *F. subulata*

Glyceria

1. First glume 1.5 mm long; lemma 5-7 nerved. *G. grandis*
1. First glume 1.0 mm long or less; lemma 7-9 nerved. *G. striata*

Hordeum

1. Plants perennial (2)
1. Plants annual (3)
    2. Glumes 30-100 mm long, spreading. *H. jubatum*
    2. Glumes 6-27 mm long, ascending. *H. brachyantherum*
3. Glumes with ciliate margins. *H. murinum*
3. Glumes without ciliate margins. *H. marinum*

Koeleria macrantha

Leersia oryzoides

Leptochloa fascicularis

Leucopoa kingii

Lolium perenne

Melica bulbosa

Muhlenbergia asperifolia

Oryzopsis hymenoides var. *hymenoides*

Phalaris arundinacea

Phleum

1. Panicle several times longer than wide; culms more than 50 cm tall, erect from a swollen bulb-like base. *P. pratense*
1. Panicle 2-3 times longer than wide; culms less than 50 cm tall, from a somewhat decumbent creeping base. *P. alpinum*

Phragmites australis

Poa

1. Plants annuals. *P. annua*
1. Plants perennials (2)
    2. Rhizomes present (3)
    2. Rhizomes absent (5)
3. Culms distinctly flattened. *P. compressa*
3. Culms not flattened, round in cross section (4)
    4. Lemmas with cob-webby hairs at their base. *P. pratensis*
    4. Lemmas without cob-webby hairs. *P. nervosa*
5. Florets becoming bulblets. *P. bulbosa*
5. Florets not becoming bulblets (6)
    6. Lemmas wooly-pubescent at their base (7)
    6. Lemmas not wooly-pubescent at their base (8)
7. Lemmas glabrous above the cob-webby base. *P. trivialis*
7. Lemmas pubescent above the cob-webby base. *P. palustris*
    8. Spikelets strongly compressed. *P. fendleriana*
    8. Spikelets little, or not compressed. *P. secunda*

Polypogon

1. Inflorescence almost oval, usually more than 3 cm wide. *P. monspeliensis*

1. Inflorescence cylindrical, usually less than 1.5 cm wide. *P. interrupta*

Puccinellia
1. Lemmas glabrous. *P. fasciculata*
1. Lemmas puberulent (2)
   2. Culms erect; herbage yellow-green. *P. nuttalliana*
   2. Culms decumbent; herbage blue-green. *P. distans*

Secale cereale

Sclerochloa dura

Sporobolus
1. Old leaf sheath bases present. *S. airoides* var. *airoides*
1. Old leaf sheath bases not present. *S. cryptandrus*

Stipa
1. Awns more than 50 mm long. *S. comata*
1. Awns less than 25 mm long (2)
   2. Plants less than 6 dm tall. *S. lettermanii*
   2. Plants 8-15 dm tall. *S. nelsonii*

Trisetum spicatum

Triticum aestivum

SUBFAMILY *Panicoideae*

1. Spikelets subtended, or surrounded by one or more bristles, these distinct, or united at the base to form an involucre, or spiny bur (2)
1. Spikelets not subtended by bristles (3)
   2. Bristles slender, distinct, persistent; spikelets deciduous. *Setaria*
   2. Bristles stout, united, falling with the spikelets at maturity. *Cenchrus*
3. Spikelets in open panicles. *Panicum*
3. Spikelets in a slender tight raceme (4)
   4. Inflorescence digitate. *Digitaria*
   4. Inflorescence not digitate. *Echinochloa*

Cenchrus longispinus

Digitaria sanguinalis = *D. ischaemum*

Echinochloa crus-galli

Panicum capillare

Setaria

1. Bristles below the spikelets yellow-brown, 5-16. *S. glauca*
1. Bristles below the spikelets green, 1-3 (2)
   2. Bristles 5-11 mm long. *S. viridis*
   2. Bristles less than 5 mm long. *S. verticillata*

Iridaceae

1. Sepals and petals alike; leaves less than 1 cm wide. *Sisyrinchium*
1. Sepals and petals dissimilar; leaves as much as 3 cm wide. *Iris*

Iris

1. Flowers violet to purple. *I. missouriensis*
1. Flowers yellow. *I. pseudacorus*

Sisyrinchium idahoense Characters often overlap with *S. demissum*

Juncaceae

Juncus

1. Plants annuals. *J. bufonius*
1. Plants perennials (2)
   2. Plants with rhizomes (3)
   2. Plants without rhizomes (7)
3. Leaves septate (4)
3. Leaves not septate (6)
   4. Leaves flat. *J. ensifolius*
   4. Leaves terete (5)
5. Flower clusters ususally 1, dark purple-brown to blackish-purple. *J. mertensianus*
5. Flower clusters 2-10, pale green to light brown. *J. torreyi*
   6. Stems without leaves, or nearly so. *J. articus*
   6. Stems with long well developed leaves. *J. longistylus*
7. Stems without leaves, or leaves reduced to bristles. *J. drummondii*
7. Stems with well developed basal leaves 5-15 cm long. *J. tenuis = J. confusus*

Juncaginaceae

Triglochin maritima

Lemnaceae

1. Plants without roots (rhizoids). *Wolffia*
1. Plants with unbranched roots (rhizoids) (2)
    2. Plants with a single root. *Lemna*
    2. Plants with several roots. *Spirodela*

Lemna

1. Plant body (thallus) ovate to orbicular. *L. minor*
1. Plant body lanceolate (2)
    2. Plant body obscurely 1-veined, the tip entire. *L. valdiviana*
    2. Plant body obscurely 3-veined, the tip denticulate. *L. trisulca*

Spirodela polyrhiza

Wolffia borealis

Liliaceae

1. Leaves small, filiform, or scale-like. *Asparagus*
1. Leaves various, but never filiform, or scale-like (2)
    2. Sepals conspicuously different in size, shape and color from the petals. *Calochortus*
    2. Sepals and petals similar, or nearly so (3)
3. Plants without bulbs, or corms, but with a definite although sometimes tuberous rootstalk (4)
3. Plants with bulbs, or corms (6)
    4. Plants 1.0-1.5 m tall; leaves 10-15 (20) cm wide. *Veratrum*
    4. Plants seldom more than 0.5 m tall; leaves much smaller (5)
5. Stems branched; flowers 1 or 2. *Streptopus*
5. Stems unbranched; flowers numerous. *Smilacina*
    6. Styles 3. *Zigadenus*
    6. Style 1, or sometimes lacking (7)
7. Plants with leafy stems. *Fritillaria*
7. Plants without leafy stems; leaves basal (8)

8. Flowers in umbellate, or sub-umbellate clusters (9)
8. Flowers not in umbellate clusters (10)

9. Perianth parts not united; plants with conspicuous onion odor. *Allium*
9. Perianth parts united at base; plants without onion odor. *Triteleia*

10. Flowers yellow. *Erythronium*
10. Flowers bluish-purple. *Camassia*

Allium

1. Bulbs divided into 2, or more segments (cloves). *A. vineale*
1. Bulbs not divided (2)

2. Ovary with six scales projecting from the top. *A. biceptrum*
2. Ovary without scales (3)

3. Leaves longer than the flowering scape. *A. brandegii*
3. Leaves shorter than the flowering scape. *A. acuminatum*

Asparagus officinalis

Calochortus nuttallii

Camassia quamash

Erythronium grandiflorum

Fritillaria

1. Flowers yellow, not mottled, sometimes with a tinge of red. *F. pudica*
1. Flowers mottled with rusty brown, pale green and yellow. *F. atropurpurea* (infrequent in our area)

Smilacina

1. Flowers numerous, in panicles. *S. racemosa*
1. Flowers few, in racemes. *S. stellata*

Streptopus

1. Flowers axillary; peduncles bent; leaves mostly auriculate-clasping. *S. amplexifolius = Disporum amplexifolius*
1. Flowers in pairs; peduncles straight; leaves not auriculate-clasping. *S. trachycarpus = Disporum streptocarpum*
(It does not appear to me that there are enough differences to warrant placing *Disporum* and *Streptopus* in different genera)

Triteleia grandiflora

Veratrum californicum

Zigadenus

1. Plants of moist meadows; ovary partly inferior. *Z. elegans*
1. Plants of dry slopes; ovary superior (2)
    2. Flowers in dense racemes (sometimes paniculate at the base of the inflorescence). *Z. venenosus*
    2. Flowers in open panicles. *Z. paniculatus*

Orchidaceae

1. Lips of the corolla inflated, sac-like. *Cypripedium*
1. Lips of the corolla not inflated, not sac-like (2)
    2. Cauline leaves absent when plants are flowering (3)
    2. Cauline leaves present when plants are flowering (4)
3. Plants green, with chlorophyll. *Spiranthes*
3. Plants not green, without chlorophyll. *Corallorhiza*
    4. Flowers with a spur. *Habenaria*
    4. Flowers without a spur (5)
5. Leaves opposite. *Listera*
5. Leaves alternate (6)
    6. Flowers white; cauline leaves absent. *Goodyera*
    6. Flowers brownish-purple; cauline leaves present. *Epipactus*

Calypso bulbosa

Corallorhiza striata

Cypripedium calceolus

Epipactus gigantea

Goodyera oblongifolia

Habenaria

1. Leaves always clustered at, or near the base of the stem; sepals 1-nerved. *H. unalascensis*
1. Leaves usually scattered along the stem, occasionally clustered at, or near the base; sepals 3-nerved (2)

2. Flowers white, rarely pale-greenish. *H. dilatata*
2. Flowers yellowish, or green, often marked with purple. *H. hyperborea*

Listera convallarioides

Spiranthes romanzoffiana

Potamogetonaceae

Potamogeton

1. Leaves of 2 kinds, submerged ones linear, emersed ones broad. *P. nodosus*
1. Leaves all alike (2)
   2. Leaves broad, leaf margins crisped. *P. crispus*
   2. Leaves linear, leaf margins not crisped (3)
3. Plants small with small whitish glands on stems and base of leaves. *P. pusillus*
3. Plants large, without any glands (4)
   4. Stipules adnate to leaf bases. *P. pectinatus*
   4. Stipules not adnate to leaf bases. *P. foliosus*

Ruppiaceae

Ruppia cirrhosa

Sparganiaceae

Sparganium

1. Stigmas 2; inflorescence branched. *S. eurycarpum*
1. Stigma 1; inflorescence not branched. *S. emersum*

Typhaceae

Typha

1. Leaves 6-12 mm wide, convex on the back; pistillate spike separated from the staminate spike. *T. domingensis*
1. Leaves 8-20 mm wide, usually flat on back; pistillate spike contiguous with the staminate spike. *T. latifolia*

Zannichelliaceae

Zannichellia palustris

KEY TO FAMILIES THAT OFTEN POSSESS IMPERFECT FLOWERS

1. Plants woody (2)
1. Plants herbaceous (13)
    2. Flowers in catkins (3)
    2. Flowers not in catkins (5)
3. Bark reddish-brown with numerous white lenticels. *Betulaceae*
3. Bark not as above (4)
    4. Leaves deeply pinnately lobed. *Fagaceae*
    4. Leaves not lobed. *Salicaceae*
5. Plants shrubs (6)
5. Plants trees (9)
    6. Leaves compound, or deeply lobed (7)
    6. Leaves simple (8)
7. Plants with tendrils. *Vitaceae*
7. Plants without tendrils. *Anacardiaceae*
    8. Plants of montane streams. *Rhamnaceae*
    8. Plants of saline flats, or dry foothills. *Chenopodiaceae*
9. Thorns present. *Moraceae*
9. Thorns absent (10)
    10. Leaves simple and pinnately veined. *Ulmaceae*
    10. Leaves simple, or compound, if simple then with palmately veined leaves (11)
11. Leaves simple and palmately veined. *Aceraceae*
11. Leaves compound (12)
    12. Leaflets coarsely and irregularly toothed. *Aceraceae*
    12. Leaflets finely and regularly serrated. *Oleaceae*
13. Plants parasitic on junipers, or Douglas Fir. *Viscaceae*
13. Plants not parasitic (14)
    14. Plants of aquatic habitats, submerged, or emergent (15)
    14. Plants of drier, montane habitats (22)
15. Plants floating, or submerged aquatics (16)
15. Plants emergent aquatics (19)
    16. Leaves opposite. *Zannichelliaceae*
    16. Leaves alternate, or whorled (17)
17. Leaves whorled. *Ceratophyllaceae*
17. Leaves alternate (18)
    18. Veins in leaves parallel. *Potamogetonaceae*
    18. Veins in leaves pinnate, or netted. *Polygonaceae*
19. Leaves with parallel veins (20)

19. Leaves with pinnate, or netted veins (21)
    20. Inflorescence an elongated spike. *Typhaceae*
    20. Inflorescence a dense globular head. *Sparganiaceae*
21. Corolla conspicuous, blue to lavender. *Verbenaceae*
21. Corolla inconspicuous, never blue/lavender. *Polygonaceae*
    22. Leaves with sheathing stipules (23)
    22. Leaves without sheathing stipules (25)
23. Sepals and petals large and showy. *Caryophyllaceae*
23. Sepals and petals inconspicuous, or absent (24)
    24. Leaves compound. *Ranunculaceae (Thalictrum)*
    24. Leaves simple. *Polygonaceae*
25. Leaves with tendrils. *Curcubitaceae*
25. Leaves without tendrils (26)
    26. Leaves lobed, or divided. *Ranunculaceae*
    26. Leaves simple (27)
27. Leaves and stems with stinging hairs. *Urticaceae*
27. Leaves and stems without stinging hairs (28)
    28. Corolla large, showly, white. *Caryophyllaceae*
    28. Corolla absent, or inconspicuous. *Chenopodiaceae*

KEY TO GENERA OF COMMON, WILDLAND WOODY PLANTS

1. Leaves needle-like, or scale-like. *Key 1*
1. Leaves not needle-like, nor scale-like (2)
    2. Leaves and branches alternate (3)
    2. Leaves and branches opposite (4)
3. Leaves simple. *Key 2*
3. Leaves compound. *Key 3*
    4. Leaves simple. *Key 4*
    4. Leaves compound. *Key 5*

Key 1. Leaves needle-like, or scale-like.

1. Leaves scale-like; cones round, bluish purple, or grey. *Juniperus* (Juniper, Western Red Cedar)
1. Leaves needle-like; cones elongated, scaly, brown when mature (2)
    2. Leaves grouped together in clusters of 2 to 5. *Pinus* (Pine)
    2. Leaves borne singly (3)
3. Needles round in cross section. *Pinus* (Single leaf pinyon)
3. Needles flattened, or 4-sided in cross section (4)
    4. Leaves 4-sided in cross section; branches with rough persistent leaf bases (sterigmata). *Picea* (Spruce)
    4. Leaves flattened in cross section; branches without rough leaf bases (5)
5. Cones with 3-forked bracts extending from the scales; needles slightly constricted at their base. *Pseudotsuga* (Douglas fir)
5. Cones without 3-forked bracts; needles without a constricted base. *Abies* (Fir)

Key 2. Leaves alternate, simple

1. Leaves at least 15 times longer than wide, entire. *Chrysothamnus* (Rabbit Brush)
1. Leaves not 15 times longer than wide, entire, lobed, or variously toothed (2)
    2. Veins in leaves conspicuously palmately arranged (3)
    2. Veins in leaves pinnately arranged, or appearing to have only a single vein (8)
3. Leaf margin, or tip lobed (4)

3. Leaf margin, or tip not lobed (7)
    4. Stems with milky, or resinous juice; plants strongly aromatic. *Rhus* (Skunk Bush)
    4. Stems without milky, or resinous juice; plants not strongly aromatic (5)
5. Leaves 3-5+ inches wide. *Rubus* (Thimble Berry)
5. Leaves less than 2 inches wide (6)
    6. Flowers yellow. *Ribes* (Golden Currant)
    6. Flowers white. *Physocarpus* (Ninebark)
7. Shrubs. *Ceanothus* (Deer Brush)
7. Trees. *Celtis* (Hackberry)
    8. Leaves lobed (9)
    8. Leaves not lobed (11)
9. Leaves 3 to 5 inches long. *Quercus* (Oak)
9. Leaves less than 2 inches long (10)
    10. Leaves 1 to 2 inches long, without stipules. *Artemisia* (Big Sagebrush)
    10. Leaves less than 3/4 inch long, with stipules. *Purshia* (Bitterbrush)
11. Trees (12)
11. Shrubs (24)
    12. Leaf margins entire (13)
    12. Leaf margins toothed (14)
13. Leaf margins curled inward toward undersurface of leaf. *Cercocarpus* (Curl leaf Mountain Mahogany)
13. Leaf margins not curled inward. *Elaeagnus* (Russian Olive) p. 41
    14. Teeth on leaf margins double (15)
    14. Teeth on leaf margins single (18)
15. Leaf bases of same size and shape (16)
15. Leaf bases of different size and shape. *Ulmus* (Elm)
    16. Stems with thorns. *Crataegus* (Hawthorn)
    16. Stems without thorns (17)
17. Bark gray, rough. *Alnus* (Alder)
17. Bark reddish, smooth. *Betula*
    18. Thorns present. *Crataegus* (Hawthorn)
    18. Thorns absent (19)
19. Petioles with a pair of small dark glands near the base of the leaf blade. *Prunus* (Chokecherry)
19. Petioles without glands (20)
    20. Leaves narrowly linear, narrowly elliptic, oblanceolate, or if lanceolate then with stipules. *Salix* (Willow)
    20. Leaves not as above (21)

21. Bark reddish-brown, glossy. *Betula* (River Birch)
21. Bark grey, or whitish green (22)
    22. Lobes of leaf base unequal in size. *Celtis* (Hackberry)
    22. Lobes of leaf base of the same size (23)
23. Bark gray, deeply furrowed. *Populus* (Cottonwood, Poplar)
23. Bark white, smooth. *Populus* (Aspen)
    24. Prickles, or thorns present on stems. *Ribes* (Gooseberry)
    24. Prickles, or thorns absent (25)
25. Leaf margin entire, or only irregularly serrate. *Salix*
25. Leaf margins regularly toothed (26)
    26. Leaves with a pair of small glands on the petiole next to the base of the leaf. *Prunus* (Chokecherry)
    26. Leaves without glands (27)
27. Teeth on leaves double. *Alnus* (Alder)
27. Teeth on leaves not double (28)
    28. Lower leaf surfaces glandular-pubescent. *Holodiscus* (Ocean Spray)
    28. Lower leaf surfaces glabrous, or pubescent, but not glandular (29)
29. Veins on leaves prominent; teeth present on leaf margin. *Cercocarpus* (Birch Leaf Mountain Mahogany)
29. Veins on leaves not prominent; teeth present only on forward half of leaf margin. *Amelanchier* (Service Berry)

Key 3. Leaves alternate, compound

1. Trees. *Sorbus* (Mountain Ash)
1. Shrubs, or vines (2)
    2. Leaves with 3 glossy green drooping leaflets. *Toxicodendron* (**Poison Ivy**)
    2. Leaves with 3-many leaflets, not as above (3)
3. Stems with prickles (4)
3. Stems without prickles (6)
    4. Stems red, or reddish brown. *Rosa* (Wild Rose)
    4. Stems green or brown (5)
5. Stems erect. *Rubus* (Wild Raspberry)
5. Stems spreading. *Rubus* (Evergreen Black Berry)
    6. Leaf margins with sharp spiny teeth. *Mahonia* (Oregon Grape)
    6. Leaf margins without spiny teeth (7)

7. Rachis of the leaf extending as a spine. *Caragana* (Pea Tree)
7. Rachis of leaf not as above (8)
    8. Leaves with 3 to 7 leaflets (9)
    8. Leaves with 11, or more leaflets10)
9. Leaves 2-3 inches long. *Rhus* (Three-leaf Sumac)
9. Leaves less than 1 inch long. *Potentilla* (Cinquefoil)
    10. Leaflets with rounded teeth; stems with milky juice. *Rhus* (Sumac)
    10. Leaflets with sharp pointed teeth; stems without milky juice. *Sorbus* (Mountain Ash)

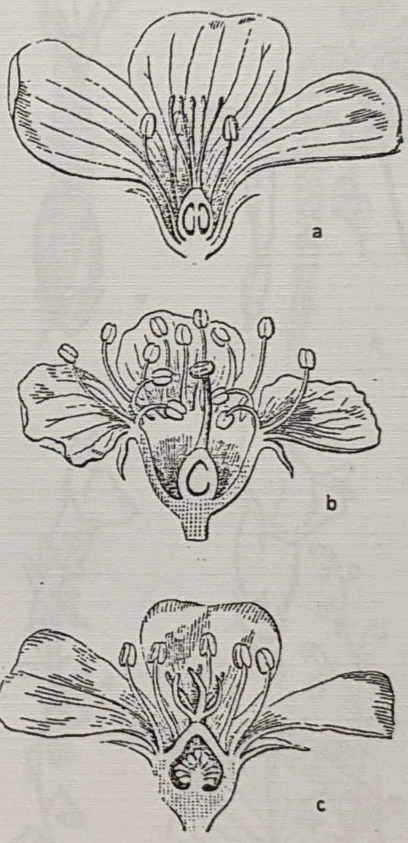
Key 4. Leaves opposite, simple

1. Leaves deeply palmately lobed. *Acer* (Maple)
1. Leaves not as above (2)
    2. Leaves toothed. *Pachystima* (Mountain Lover)
    2. Leaves not toothed (3)
3. Bark of most stems distinctly reddish-brown in color. *Cornus* (Red Osier Dogwood)
3. Bark not red in color (4)
    4. Leaves 2 to 3 inches long. *Lonicera* (Twin Berry Honeysuckle)
    4. Leaves less than 1 1/2 inch long (5)
5. Leaf tip rounded; bundle scar 1. *Symphoricarpos* (Snowberry) p. 18
5. Leaf tip gradually tapering to a blunt point; bundle scars 3. *Lonicera* (Honeysuckle)

Key 5. Leaves opposite, compound

1. Plants vine-like. *Clematis* (Clematis)
1. Plants trees, or shrubs (2)
    2. Trees; leaves with 3 to 5 leaflets; stems not pithy. *Acer* (Boxelder)
    2. Shrubs; leaves with 5 to 7 leaflets; stems pithy. *Sambucus* (Elderberry)

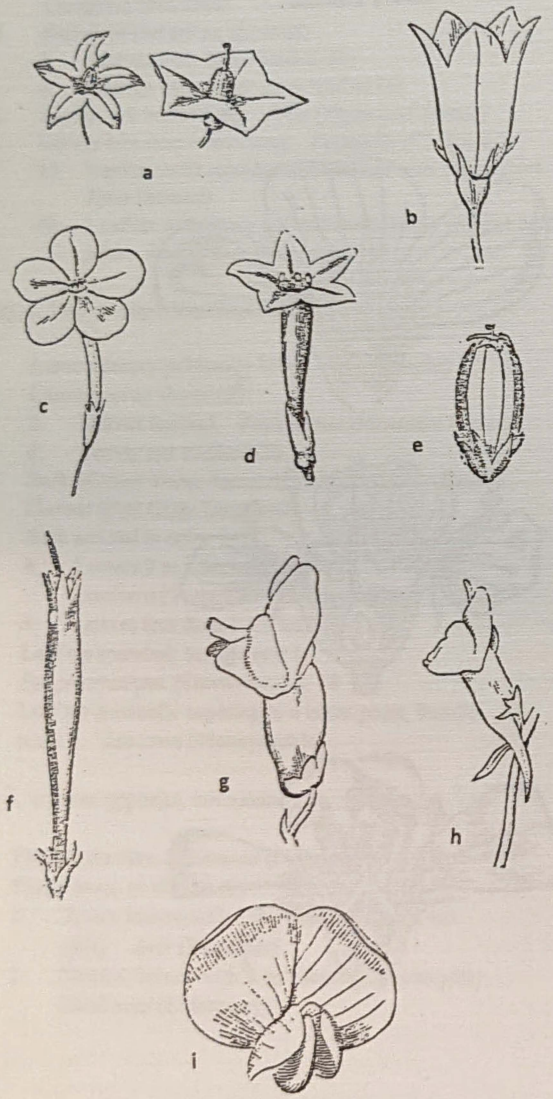
Ovary Position



a. Superior (hypogynous) b. Superior (perigynous)

c. Inferior (epigynous)

Corolla Types

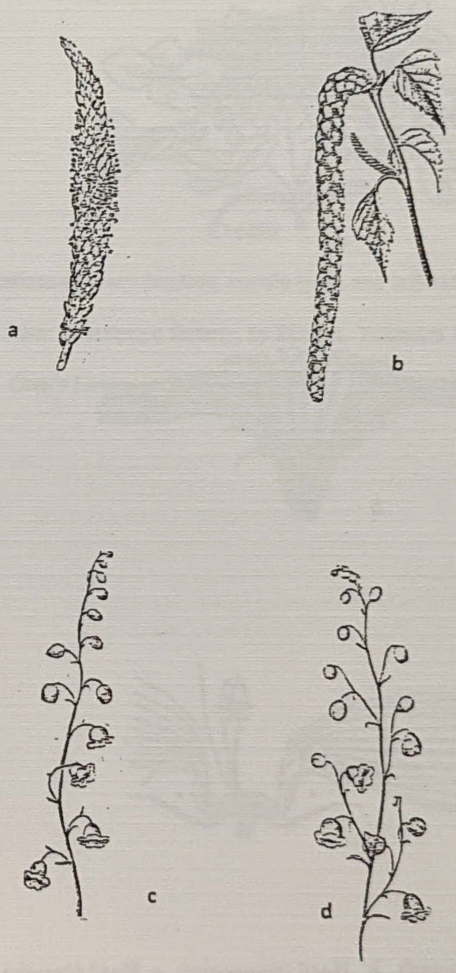


a. rotate b. campanulate c. salverform d. funnel-form

e. urn-shaped f. tubular g. two-lipped h. with a spur

i. papilionaceous

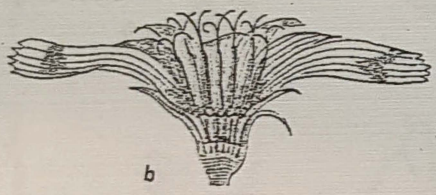
Inflorescence Types



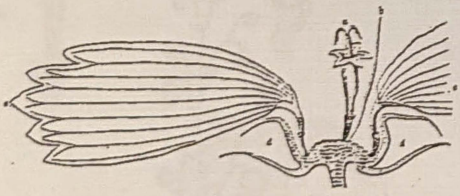
a. Spike b. Catkin c. Raceme D. Panicle

Inflorescence Types Cont.

a



b



c

a. Cyme (compound) b. Head (composite) c. Head (details)

a. disk flower b. chaff c. pappus d. involucre e. ray flower

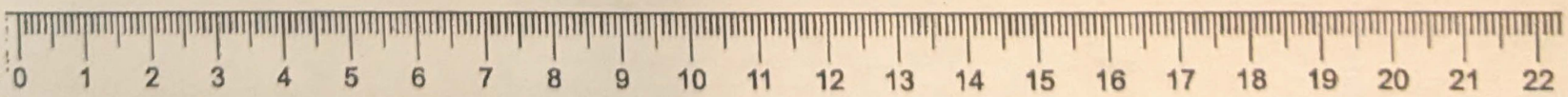
Credits

Illustrations of ovary position, corolla types and inflorescence types are from: Descriptive Botany, by Eliza A. Youmans 1889 and Gray's Lesson in Botany revised, by Asa Gray 1887

About the author

Stephen L. Clark is a native of Clearfield, Utah. As a small child he became interested in how plants were used by Native Americans for food, medicine and tools. As an adult his curiosity and interest in wild plants and wild places broadened to include plant taxonomy. Yet, entwined within his studies was an ever-present fascination with the patterns and symmetry he saw in plant form. In retrospect, he admits his interest in botany was based more on art than on science. He graduated from Weber State University in 1964 with a B.S. in botany. He earned an M.S. Degree in botany and plant taxonomy from Utah State University in 1967 and a Ph.D. in botany and plant taxonomy from Brigham Young University in 1980. He has taught at Weber State University since 1965 where as Professor of Botany and Director of the Herbarium he continues his interest in floristics, ethnobotany, the plight of indigenous people and the origins of pattern and symmetry.

Index to Families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